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Timber and Log Markets for the Forest Resources of British Columbia

Theory, Practice and Proposals in a Competitive Regime

A Study Conducted for the
British Columbia Forest Resources Commission
Victoria, B.C.

By

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SUMMARY

This study deals with timber and log markets, and their application to British Columbia. These markets are examined by means of a literature survey covering markets in the U.S. and Scandinavia, and a descriptive review of existing markets in the Coast and Interior regions of B.C., and the South and Pacific Northwest regions of the United States.

From a survey of articles and monographs published by academic journals, universities and public forest agencies, it is concluded that timber and log markets are efficient in providing wood supply for the needs of the forest products industry, and in permitting producers in the industry to obtain their raw material needs from a variety of sources.

Conditions arise in both U.S. and Scandinavian markets, particularly at the local or area level, in which a major participant in a local market (generally a large pulp mill which is a net purchaser of fibre) may exercise unequal market power over sellers and smaller competitors. In the main, however, generally competitive conditions are found to exist, and a number of practices and approaches in both public and private timber markets assist that result.

How Markets Work in Other Forest Regions

The factors determining supply and demand in timber and log markets are cited in the literature review. For example, the demand for timber is derived from or determined by four main factors. These are: (i) the demand for final pulp, paper, lumber and other wood products in national and international markets; (ii) the cost of other inputs into both timber and final product output; (iii) technological change which can affect both supply and demand; and (iv) the prices in the market for timber and logs from the various supply sources.

For a depiction of a market, a description of the ways in which sellers and buyers operate in the various markets and their submarkets is set out in the review of market cases. In B.C., the Vancouver Log Market on the Coast and the informal timber and log market in the Interior are involved in about 30 per cent (some of which is in the form of trades) of the total annual harvest from Crown and private timber combined, with the other 70 per cent drawn from industry tenures.

In the other regions studied, these proportions are reversed. In the two U.S. regions, the average fibre self-sufficiency level in the forest products industry is in the range of 30 to 35 per cent of annual needs, with even lower ratios in Finland and Sweden. As a result, companies in these other regions rely on timber or log markets to provide the major part of their wood supply needs. This supply comes from two main categories of sellers.

The first source, and the most important in the U.S. Pacific Northwest, consists of federal and state public timber offered at regular timber sale auctions. These sales are based on pre-announced 'appraised' or reservation prices which must be met or exceeded in any bids. These prices are calculated to cover the full costs - including regeneration - of the selling agency. The average length of U.S. Forest Service timber sales is three years; with the sold but uncut volume used by buyers as forward supply over the period; and with the major part of payment made at the time of harvest.

The second category, and the most important in the U.S. South, Finland and Sweden, is a variety of 'nonindustrial' sellers who are private owners of forest land, generally without any processing facilities. Sellers in this category include woodlot owners, individual farmers and ranchers, large landholders, and banks, pension funds, insurance companies and investor partnerships. These nonindustrial owners sell timber and logs on a spot basis or by forward contract. They sell into a cash sawlog or pulpwood market, by negotiated contracts with forest products companies, through brokers and dealers, by inviting bids or holding auctions, or by forming cooperative selling groups to increase their bargaining power.

The buyers of standing timber and logs are the producers in the forest products industry. In each region, there are large integrated companies engaged in both pulp or paper and lumber and panels. There are smaller non-integrated companies, concentrated in the wood products sector. In Finland, Sweden and the U.S. South, larger companies buy pulpwood and compete with the non-integrated companies for sawlogs and 'smallwood'. In regions like the U.S.Pacific Northwest, 90 percent of the fibre needs of the pulp and paper mills of the integrated companies are provided by sawmill and plywood mill chips. Competition is thus focussed on sawtimber or sawlog supply.

Between sellers and buyers, and among industry members with wood to trade, a series of market interactions develops. Timber and log markets work and continue to function because an ownership diversity between state, nonindustrial and industrial forest holders creates both adequate raw material supply and competition on the part of both sellers and buyers. In addition, the availability of "market" wood reduces the amount of investment capital needed for the purchase and management of timberlands. As well, these markets provide the opportunity for greater cost and operating efficiency in the organization of wood supply, as industry participants are able to shift their fibre sourcing between the volume they buy from timber and log market sources and the harvest cut level from their own lands.

Thus, given the system of tenures and property rights in the other regions studied, what exists are mainly private markets or, in the case of the U.S. Northwest, a combined private and public timber market with an ancillary private log market. Even in Sweden, in which the institutional features of the market have provided for consortiums of industry buyers and private sellers, intervention by the state in the market has been limited.

Commission Objectives and Market Alternatives

This situation does not apply in B.C. The difference arises in the relative importance of public lands. Public forestland accounts for less than 50 per cent of the harvest in the U.S. Northwest (and is further divided between federal and state agencies), 25 per cent in Sweden, 10 per cent in the U.S. South, and an even smaller proportion in Finland. In contrast, 94 per cent of commercial forest land in B.C. is owned by the Province. Thus, in seeking to apply a competitive market framework for the allocation and pricing of forest resources in B.C., a difficulty arises between the efficiency of privately operated and functioning markets for timber and logs on one hand, and the predominant ownership position of the Crown in the resource on the other.

A further complication arises in the rationale for larger, more competitive markets. This basis has been discussed in the reports of government-established committees and commissions, including the Task Force on Timber Disposal (1974), the Royal Commission on Timber Rights and Forest Policy (1976), the Select Standing Committee on Forests and Lands (1990), and the Forest Resources Commission (1991). These inquiries have come to essentially the same conclusion, that log and timber markets should be competitive, have price reporting, and be given some form of surveillance by a public body.

The report of the Forest Resources Commission proposes further measures. A market with not less than 50 per cent "market" wood would be established to provide a more competitive and accessible allocation of fibre. Sellers in this market would be the Crown with one-quarter of the public timber harvest and nonindustrial tenure holders with a further quarter of Crown AAC. Buyers would be producers in the constituent forest industries of B.C. From this process, the market would offer continuous price signals both to buyer and seller participants, and to the Crown owner of the resource. Given this market evidence, stumpage charges on Crown timber harvested within industry tenures could also be based on prices established in the market.

Industry members in discussions for this study generally do not share this approach. Instead, they advance two other options. One is to leave the Coast and Interior log or timber markets as they are, allow them to "evolve" without supervision or regulation, and create no interference in the market process. The other is to privatize either land or timber, or to simulate a private setting by such means as long-term tenure equal to a forest rotation. From these secure rights, from which both short- and long-term decisions can be made, it is argued that a market will naturally develop.

While the advantages of a more diversified system of timberland ownership can be advanced, it remains that timber and timberland have not been alienated by the Province to private holders for some 85 years. Without any modification in this policy, an American or Scandinavian system of private forest ownership is not a probable option in B.C. While the great part of timberland is likely to remain in Crown ownership, a private market is likely to be more efficient than one controlled or managed by government. A solution for the introduction of a large, competitive timber and log market in B.C. must thus be able to reconcile this distinction between public ownership and private market. As this approach has no exact precedent, it is a matter that needs to be carefully assessed.

Proposals and Recommendations in the Study

The organizational basis proposed for a timber and log market in B.C. is self-regulation and operation by the market participants themselves, with oversight provided by a provincial regulatory agency. This model has precedents in a number of industry sectors, professions, and exchanges. The self-regulated market would be responsible for all operations; draft trading, conduct and fairness rules; and deal with infractions or abuses. In this respect, the market is a franchise, which can be kept as long as it is upheld.

The market organization could have no direct affiliation with any existing industry organization. Instead, sellers, buyers and log and timber brokers would be members of the organization. All members would be licensed, and non-members would be obliged to sell or buy through licensed members. Formal licensing of members would be the responsibility of the oversight agency. There would be an annual report, an annual meeting, and at least one annual audit and review by the provincial oversight agency.

The market organization would supervise the timber and log markets. Separate market operations committees of the organization would be established for the Coast and Interior regions, coordinated by a joint central board. The functions or services provided by the market would include notice of all forthcoming auctions, listings of log and timber sales, a central registry of buyer, seller and broker members, a registry of qualified timber cruisers, auctioneers and scalers, and regular price reporting of all transactions of timber and log sales in the market.

Both spot and forward markets would be developed. Procedures for bidding, sale size, contract length, sale frequency and pricing would be designed to encourage buyer participation, and ensure a competitive basis for sales and trades. The measures also include, on sellers, limits on the volume of negotiated sales; and, on buyers, "position limits" in Crown or nonindustrial sales. These restrictions are necessary to check the development of local market control by major buyers, and to ensure raw material in a competitive market for smaller producers.

All Crown timber sales would have to meet or exceed a full cost 'appraised' price. Crown timber would be offered on a continuous basis in the market, and 'unsold' sales withdrawn to be recycled later. Auctions would be advertised through the market organization. On completion of the sale, the Crown agency would report the price and all other required information to the market's price-reporting service. For a transitional period, the U.S. Forest Service practice of reserving a portion of total volume as "set aside" sales for smaller or independent producers could be adopted.

The Implementation Process to a Market

The introduction of a large timber and log market in the province would be an act of public policy. As such it would need Ministerial coordination and direction. The participation of all membership groups in the market would also be required. Seven steps are proposed in the market formation process.

The first decision is the designation of a Crown agency (perhaps an existing regulatory commission) to oversee and review the self-regulated market organization. As the Crown would be a seller of timber in the market, and would have a direct revenue interest in its outcomes, this agency should not be the Ministry of Forests.

The second measure is to designate the Crown timber selling agency. This selling body can be a unit of the MoF, or a separate forest agency reporting to the Minister.

The third step would be the formation of a broadly representative working group drawn from the various industries and member categories that would participate in the market. This group would draft the basis for the market organization (which need not be large or elaborate), its operations and procedures, and its trading and conduct rules.

Fourth, the draft market organization is discussed, negotiated with the Minister of Forests, and formed.

Fifth, by whatever criteria and competitive processes are deemed most appropriate, the nonindustrial tenures are awarded.

Sixth, the log and timber market committees for the Coast and Interior regions are formed and the services and functions of the market body are developed.

Seventh, the market is open for business, and sales and purchases begin.

From its inception, this process is proposed to be accomplished in one full year. The essential elements in the process are Ministerial policy direction and the involvement of industry participants who would become market members from the outset. By this approach, the combination of an efficient privately organized market and the dominant position of Crown timber in the harvest is proposed to be achieved.

A number of the intricacies involved in this process are not discussed in this study. For these matters, the assumptions as to tenure restructuring and other issues as provided to the study by the FRC are summarized early in the third chapter. Moreover, specific practices now adopted by participants in the existing Coast and Interior markets are assumed to be carried into a new timber and log market framework unless otherwise indicated.

These and other relevant questions are raised by the reviewers of this paper in their critiques which are also published in this volume. While the present authors acknowledge the validity of a number of these comments, it is better to leave the draft text of this study that was provided to the reviewers by the Commission essentially as it was received. The reason is that, in combination, the reviews provide a cross-section of informed and expert opinion as to the formation of a market. To the extent that there is a criticism or dispute with findings or comments in this study, the text which was the subject of complaint should be left as intact as possible. In this way as well, the reader will be better able to make his or her own judgement as to which approach (if any) is to be preferred.

Chapter I
TIMBER AND LOG MARKETS IN THE LITERATURE

This study reports an examination into markets for timber and logs. It has three parts.

The first part is a survey of relevant literature, mainly in the field of forest economics, concerning fibre markets in the U.S., Sweden and Finland.

The second part is a review of existing timber and/or log markets in the B.C. Coast and Interior regions, and in somewhat more detail in the two largest fibre markets on the continent, in the U.S. South and the U.S. Pacific Northwest.

The third chapter outlines the present framework and composition of a B.C. timber and log market, and adopts a number of elements, approaches and mechanisms from the above reviews in the expansion of the existing markets in B.C.

These three tasks express the terms of reference for the study as set out by the British Columbia Forest Resources Commission. In addition, the Commission specified a number of assumptions for the outline in the third chapter. These assumptions are that 50 percent of the annual harvest is to be placed and transacted in the market; the Crown would be a direct seller of a part of this transacted volume; and the balance of the "market" wood supply would be provided by nonindustrial tenure holders without processing facilities.

These tasks and terms of reference were among the subjects of discussions with forest industry members at 30 meetings held between December, 1991, and March, 1992, at Cranbrook, Kamloops, Kelowna, Prince George, Vancouver and Williams Lake. While not specifically reported, except for one issue raised in the third chapter, their concerns have been considered in the course of this study.

The following literature survey which introduces the study was conducted on a somewhat different basis. In addition to assistance provided at the MacMillan Library, Faculty of Forestry, University of British Columbia, the major source of the articles and monographs reviewed has been a number of the principal authors themselves. As a result, papers not found in the library catalogues, as well as forthcoming publications, were available for inclusion. In addition, the opportunity was taken during discussions with these authors to deal with some of the issues involved in the formation or further development of a market in B.C.

The one constraint in the literature review which now follows has been a request by the Commission that any reporting be directed to findings or conclusions which might have an application to the formation of a market. While this request has been adhered to, it presents a difficulty in that the bases of many of the citations are econometric models of regional or national timber markets developed expressly for testing and prediction. The approach which has been adopted, therefore, is to extract results which may be useful to the purpose of the study, and to include direct quotations where appropriate in order to give these particular emphasis.

At the conclusion of the chapter, brief reference is made to further recent work outside the realm of forest or natural resources economics, but which has been incorporated in articles concerning fibre markets. Together with the type of work cited in the review, and the timber market models reported from a recent research survey (Newman and Wear 1990), this additional research may be useful in further consideration of the subject.

Market Expositions in Texts, Articles and Studies

Markets for timber and logs exist in a number of important forest regions. They have been studied extensively.

A review of catalogues, citations and journals indicates, however, that no single source exists which encompasses all aspects of these markets, much less a selection of two, three or more. Inquiries in conversations with a number of leading authorities in the field confirmed that there is no text or standard reference on timber or log markets. Nor is there any set of papers on the subject collected in an edited compilation, nor a survey article of the literature. What exists instead is a body of work in three forms.

The first set consists of chapters on timber supply, demand, market structure and price determination in forest economics texts. Examples include David H. Jackson, *The Microeconomics of the Timber Industry* (1980); G. Robinson Gregory, *Resource Economics for Foresters* (1987); and Peter H. Pearse, *Introduction to Forestry Economics* (1990). A more advanced treatment, drawing from the Swedish resource and industry, is contained in Per-Olov Johansson and Karl-Gustaf Lofgren, *The Economics of Forestry and Natural Resources* (1985), discussed separately later in this review.

For both producers and purchasers, these chapters explain behavioural assumptions, marginal efficiency conditions, competitive elements and market processes in microeconomic theory, and apply these to the forest. Market solutions - competitive and imperfectly competitive - are developed in the determination of equilibrium price. In their analyses of U.S. markets, Jackson and Gregory further distinguish between public timber agencies and private sellers on the supply side, as sale characteristics and sellers' motivations are found to differ in each case. The framework presented in Pearse's exposition incorporates longer-run elements and inventory effects.

The second series is composed of an extensive number of journal articles in scholarly or scientific periodicals concerned with forestry or natural resource issues and research. These journals include *Forest Science*, *Land Economics* and the *Natural Resources Journal*, as well as such economics journals as *Economic Inquiry* and the *Review of Economics and Statistics*, to which leading authorities in the U.S. but also in Scandinavia and other jurisdictions have contributed. The progression of subjects and issues treated in a series of leading articles is summarized below.

The third major source consists of monographs and other publications of important agencies or institutions concerned with forestry economics or the economics of natural resources. These organizations include the U.S. Forest Service, particularly the economics units in the research stations in the Pacific Northwest and South-East regions; the College of Forest Resources of the University of Washington in Seattle; Resources for the Future Inc. (RFF) in Washington, D.C.; and the Forest Economics Policy Analysis Research Unit (FEPA) at the University of British Columbia (UBC).

Often, the leading contributors of important journal articles are also the authors of major studies published by the agencies and institutions. In addition, they frequently combine in jointly authored work. Among these contributors are Professors Darius Adams, Bruce Lippke and Thomas Waggoner of the University of Washington; David Jackson of the University of Montana; David Newman of the University of Georgia; and Clark Binkley, formerly of Yale University and now Dean of the Faculty of Forestry at UBC. At the U.S. Forest Service, national and Northwest regional studies have been led by Dr. Richard W. Haynes and his colleagues; and in the South by a number of research economists including Dr. David Wear.

In addition, the U.S.-based journals have published, and a number of leading American authorities have collaborated with, their Swedish and Finnish counterparts. A number of modelling techniques in the development of timber market models are acknowledged to have originated in Scandinavian research, made accessible by publication in North America. For example, in the review in this chapter one Finnish and two Swedish citations are included.

For a jurisdiction like British Columbia, the usefulness of this broad range of theoretical and empirical literature is that it has been based on actual markets for timber and logs (the former much more than the latter) in which various forms and levels of competition among buyers and sellers obtain. This body of work is not intended to describe in any great detail how and by what processes and motivations these markets operate on an industry or company basis. For this description, regional reviews of an industry-based nature are required.

Rather, the purpose in the academic or research literature is to elicit from volume, price and transaction data relevant features of efficient markets, as well as the behaviour, response and motivation of market participants. The analyses also tend to be concerned with supply, demand, inventory, input, substitution, elasticity, cost or other factors in timber or product markets which may influence price levels and movements; and, in terms of relative degrees of market efficiency or market imperfections, with the nature of the process of competition in a timber market setting. Both the formats and content of this work may be briefly summarized.

Scope, Directions and Issues in Research Studies

Research studies into timber and log markets do not provide a fully consistent and sequential body of work for reference or application. Instead, studies use particular time-series or are undertaken at specific points in time, and so differ one from another. In addition, studies by one author or group of co-authors may often build on previous work (their own and that of others), but do not necessarily represent a continuation or updating. Studies may shift in direction or area of interest, so a consistent stream of research - on the same subject, in the same region - may not develop.

Moreover, a set of research studies may not group together on a cross-sectional basis. For example, analyses of the sawlog market in Finland (Kuuluvainen 1986), sawtimber in Sweden (Brannlund et al. 1985), or pulpwood in the U.S. South (Newman 1987, Binkley 1991) may not be replicated for other regions. Instead, the methodology or conclusions may be adapted by other authors for other purposes. Thus, one round of research into the market for the above products leads to a new round of inquiry into elements in the previous studies prompting further exploration.

Consequently, studies shift in their focus of concern, as issues are raised and ultimately resolved. The question of which procedure - oral bidding or sealed bids - would provide the greater degree of competition at timber sale auctions (Haynes 1977, Johnson 1979) was resolved in the light of subsequent analysis (e.g., Mead et al. 1983) in favour of sealed bids. Price monitoring methods (Haynes 1980), price reporting techniques, data quality issues, and transactions evidence (Haynes and Warren 1989, Haynes 1991) were subjects receiving discussion in the 1980s; as were a re-examination of auction market and payment procedures (Muraoka and Watson 1986), and influences and processes on timber market outcomes (e.g., Adams and Haynes 1991).

Timber supply and timber demand were uncoupled and separately examined. Timber supply was assessed in a number of respects in both a global scale (Dykstra and Kallio, 1987; Kallio, Dykstra and Binkley 1988; Sedjo and Lyon 1987, 1990), as well as at the regional level (e.g., Adams and Haynes 1989). Demand studies were applied to public timber (e.g., Adams 1983), and nonindustrial private timber (Alig and Wear 1992). Studies into public timber extend from the earlier work of Walter Mead (1967) and William F. Hyde (1976). A number of the theoretical foundations for the analysis of private timber, especially nonindustrial owners, originate with the work of Binkley (1981).

In the process, a variety of issues was explored, including the degree of price sensitivity in public timber sales (Adams, Binkley and Cardellichio 1991); the level of public sales on offerings of private timber (Connaughton and Haynes 1983); the relation of volume offered and wood prices (Buongiorno, Bark and Brannman 1985); and the related issue of the impact of unsold volume on timber market values (Huang and Buongiorno 1986).

Two further divisions in research topics have occurred. Increasingly a distinction was made between competitive and imperfectly competitive markets, with the latter appearing as both more analytically interesting as well as more prevalent (Johansson and Lofgren 1985, Gregory 1987). The other refinement was between the short-run and the longer-run, not only in effects on timber supply (Cardellichio et al. 1988 for short-run global, Cardellichio et al. 1989 for Pacific Rim to 2000); but also in the effects of longer-run production trends on markets, prices and such as other matters as the level of timber-related investment (Wear and Newman 1991; Wear, forthcoming).

Prices have also become a specific focus of inquiry. This research is extensive and includes the role of timber sale bids as futures contracts (Mead et al. 1983); the importance of expectations about future prices (Binkley and Vincent 1988); different price levels between types of ownership (Jackson 1987, for state vs. federal); price and other impacts from market restrictions such as those on log exports (Lippke and Perez-Garcia 1992); the effect on non-timber related supply constraints (spotted owl, forest 'replanning', log exports) on domestic timber and product prices (Flora and McGinnis 1991); or, for sellers, the issue of the optimal reservation price, especially in conditions of fluctuating price and demand levels (Brazee and Mendelsohn 1988).

The Role and Structure of Timber Market Models

Most recent research into timber and log markets has been based on what are termed timber market models. A leading example in the origination of this process was the Timber Assessment Market Model (TAMM) of the U.S. Forest Service (USFS). This model was developed under the leadership of Darius M. Adams and Richard W. Haynes in the latter 1970s in keeping with the Service's mandate to undertake periodic assessments of the national resource and 50 year projections of supply, demand and prices (Adams and Haynes 1980; USFS 1990, for the most recent projections for 1989-2040).

Given the long run nature of the forest resource in terms of growth, treatment measures, harvest and investment decisions, optimal rotation ages and supply adequacy or 'gaps' (Samuelson 1976), and with ample data on production and consumption trends for final products, the use of models to project market patterns and prices for timber for an extended period of time was a constructive development. Once these models were formulated, they could also be adapted for prediction of shorter-run market phenomena, as well as for research into elements and aspects of markets and market participants themselves.

These research developments have been reviewed by Newman and Wear (1990). Recent market models are stated to define the interaction of timber supply decisions of individual producers with timber demands. In this process, the timber stumpage market is the "interface" between timber growers and wood products industries (defined as lumber, plywood, pulp and paper). The basic structure of such a model derives from equations of supply and demand and a market equilibrium equation (Newman and Wear 1990:8).

The assumptions in the more recent market models respecting the influences on demand and supply have been refined and revised. In earlier analyses, the demand for stumpage was regarded as derived solely or principally from demand and price levels for final forest products. The demand relationship is now seen to be considerably more complex. As to supply, in addition to other influences the level and reservation price of timber supply may be conditioned by the multiple outputs from the forest, or by technical change and its effect on output costs. Similarly, assumptions treating timber or log buyers as purely profit maximizers, or timber sellers as utility maximizers, have tended to be broadened.

Thus, postulating an "idealized" estimation model, Newman and Wear are able to suggest some specifications for both demand and supply factors. The quantity of timber demanded can be proposed to be a function of stumpage price, final goods prices, demand for complements to forest products, prices of substitute final goods, and technical change in the forest industries including changes in the relative usage of labour, capital and energy. In demand, the costs and productivities of other factors may lead to substitution effects, which may positively or negatively affect the demand for timber; while the development of substitute final products (and their prices) will trace back to the timber input.

For stumpage, increases in the prices of final products are positive for timber prices and quantity demanded (as expected from derived demand), while decreases are negative. Price reductions in labour, capital, energy used by forest industries are negative for stumpage, as relative prices favour the (now) less costly other inputs. Increases in the demand for substitute products are negative for stumpage prices; while similar increases for complements are positive. The effect of technical change on stumpage demand can be either positive (if it reduces timber costs) or negative (if it reduces timber usage).

In the "idealized" model, the quantity of timber supplied is a function of equilibrium stumpage price; the input costs of labour, capital and energy; whether multiple outputs from the forest (wildlife, recreation, watersheds, pulpwood, sawtimber, etc.) are complements or substitutes in production; and technical change - which, when applied to timber, is assumed to lower production costs and thus have a positive effect on supply. When based on adequate and accurate data, and correctly specified as to relative weights and positive or negative signs of the variables, the idealized market model could then generate results for prediction, policy analysis, investment decisions and identification of the behaviour and characteristics of a regional timber market.

A further principal focus of investigation from the use of timber market models is in the estimation of supply, demand or inventory elasticities. In earlier work, solidwood or sawtimber stumpage demand was driven only by demand in final goods markets and by product conversion factors. As a result, supply elasticities in response to changes in stumpage prices tended to be relatively low (Newman and Wear 1990:9-10). More recent results in both U.S. and Scandinavian studies suggest a substantially greater responsiveness of supply to price (Kuuluvainen 1986, Newman 1987).

Further recent research involves relative degrees of market power, information efficiency (and the effect of the existence or otherwise of price reporting), risk assessment in timber growing, portfolio diversification in timber assets, and the impact of inventory changes on demand, supply and timber investment. Proposed research directions which can be specifically addressed by the use of timber market models include more detailed examinations of the concentration of firms at the local level (e.g., Brannlund et al. 1985, Binkley 1991), timber production technology, wood products technologies, and timber market imperfections, and their effects on prices and costs. In terms of policy, although intended for application to the U.S. South, Newman and Wear propose (1990:15):

> Further research lies in three distinct areas: market structure, externalities, and risk and uncertainty. Understanding the effects that oligopsony and monopsony have on price formation (and on the appropriate form of market models) is critical to conducting accurate policy analysis. The effects of externalities, both with regard to the valuation of nontimber products from forest management, and the effects of pollutants on growth and yield, need to be studied from a regional timber perspective. Risk and uncertainty is inextricably tied up with the investment calculus of individual landowners and will have an extremely important bearing on future timber supply.

As with the scope and detail of research studies, the existence of well-formulated timber market models is useful for a regional forest jurisdiction such as British Columbia which may have an interest in the introduction of more extensive timber and log markets than presently exist. Two principal uses can be suggested. First, the methodology and expertise exists for the construction of a competitive timber and log market model for B.C., in part as an aid to policy development. Second, once a larger-scale competitive market were formed and operating, a timber and log market model (perhaps developed and maintained jointly by the UBC Faculty of Forestry and the Ministry of Forests) could serve as a useful mechanism for both monitoring and research.

Economic Studies in Regional Timber Markets

Eight studies concerning regional timber or log markets have been selected for individual review for this study. The selection is based on the two criteria: the relevance of the work for consideration of a comparable market in B.C., and the distinction of the authors. As research into timber markets has tended to evolve with each generation of articles and studies, they are discussed in chronological sequence. While repetition in these studies is avoided in the review as much as possible, it is necessary to caution that the research tasks in this set of papers vary considerably. For the reader this approach may cause the appearance of randomness. This outcome is not intentional. Instead, it is hoped that a mosaic of timber markets in their various forms and manifestations may be able to emerge.

The studies concern the U.S. Pacific Northwest, Sweden, Finland, and the U.S. South. The first, by Adams and Haynes (1983), applies to the Pacific Northwest and other U.S. forest regions. It summarizes a series of 15 simulation adjustments to estimate the effect of various influences on timber demand or supply, and thus provides an overview of the economic setting for the timber market process. The second paper, by Mead, Schniepp and Watson (1983), is an examination into a number of tests indicative of a competitive bidding market for timber, applied to USFS sales in the Pacific Northwest. With this analysis, participant behaviour can also commence to be examined.

The third, fourth and fifth research papers represent Scandinavian research into timber and log markets, specifically by authorities at the College of Forestry, Umea, Sweden, and at the University of Helsinki. The two Swedish studies, by Johansson and Lofgren (1985), and by Runar Brannlund, Johansson and Lofgren (1985), examine a variety of market structures in the context of sawtimber and pulpwood markets in Sweden, and introduce variants to perfect competition into the review. The fifth study, that of Jari Kuuluvainen (1986), reports results and conclusions from an econometric analysis of the sawlog market in Finland. Among the variables, stocks of timber and logs are included in the supply analysis, as well as the level of commercial fellings.

The sixth paper, by David Newman (1987), carries forward the distinction between solidwood and pulpwood submarkets in an econometric study of the stumpage market in the U.S. South, exploring supply elasticities for price (stumpage and product) and inventory changes, and cross-elasticities between the two primary products. The seventh, again by Adams and Haynes (1991), offers a retrospective examination of stumpage markets in the U.S. Northwest, linking previously sold but as yet uncut volume with sale and harvest price measures and current sale volumes, and National Forest and other public and private timber supply. The eighth study, that of Binkley (1991) concludes the review, and is an examination of imperfections arising from monopsonistic behaviour in the attainment of competitive market solutions in pulpwood markets in the U.S. South.

These summaries may indicate not only the range of research during the last ten years, but also the combination of elements which may need to be considered in establishing a large and competitive timber and log market in a major forest region. There will be a brief conclusion to this chapter following the review, in terms of these factors as they may need to be carried forward into the later discussion on implementation.

Timber Demand Influences; Haynes and Adams (1983)

This U.S. Forest Service study utilized results and projections from the TAMM model developed by the authors, Darius Adams and Richard Haynes. The research project reported in the study involved a systematic evaluation of a number of possible influences on supply, demand and price levels for National Forest timber, compared with those projected for the 1980-2030 period in a base case market assessment conducted by means of the TAMM model in 1979, and reviewed in 1983.

The concern of the study was with the selection and impacts of alternative assumptions affecting aggregate timber demand or supply at the regional level. The testing of these assumptions by means of simulation analysis also permitted an indication of which factors (among those tested) might exercise the greatest influence on timber markets. Among these "sources of uncertainty" were changes in (i) the level of housing demand (itself largely influenced by interest rates), (ii) product and species mix, (iii) international trade patterns, (iv) Canadian delivered wood costs, (v) recovery efficiency and yields in forest products processing, (vi) changes in land use and management, and (vii) the level of National Forest harvests. (Haynes and Adams 1983:20-23).

From these and other variables, 15 separate simulations were developed, based on such varying assumptions as low housing starts, no log export restrictions, 10 and 20 percent tariffs on Canadian lumber imports, 5 per cent per decade increases in lumber and plywood recovery by processing mills, accelerated rates of National Forest harvests, reduction of private commercial timberland area, low growth in timber markets, and intensified forest management by (a) the forest industry and then (b) by all private owners.

The impacts on timber demand and prices in the various scenarios differed considerably. Low housing starts at 25 per cent below the 1983 projection would lead to the greatest decline in wood use, although real prices would continue to rise, but at a reduced rate. The removal of (then) log export restrictions would have mixed effects, as stumpage prices would rise, lumber production would decline by seven per cent, and the total harvest would rise only slightly. As for the imposition of an ad valorem duty on Canadian lumber (Haynes and Adams 1983:27):

> The simulations illustrate that a tariff on Canadian lumber imports acts to improve the competitiveness of all U.S. supply regions. In both tariff simulations, demand is reduced in the East as a result of higher lumber prices, while expanded production comes primarily from the South. Increased production in the Pacific Northwest, however modest, would lead to increased stumpage prices, further depletion of private inventories, and lower future harvest levels.

Improved processing efficiency leads to declining rates of harvest increase in each of the five decades of the projection period. Demand for timber still increases, however, because lower processing costs translate into lower real prices in competitive product markets, thus increasing final product demand. A doubling of National Forest harvests (specified as a departure from non-declining even flow harvest levels) yields a combination of (a) lower product prices, (b) higher production and demand levels, (c) the lowest level of imports, and (d) the lowest stumpage prices among all the simulations. Less rapid rates of increase in the harvest would moderate these effects. Even so, Northwest stumpage prices fall by 27 per cent, leading to a 22 per cent increase in lumber production.

Changes in land use management are mainly found to affect the 72 percent of U.S. commercial timberland held by private timber owners. If the change is a loss in private timberland, the major reduction comes in the U.S. South. Conversely, a further simulation accepts all forest management opportunities which yield a real rate of return on investment of 4 per cent more. In this event, lumber production and stumpage demand are greatest in those regions which realize the largest growth and inventory increases: the Northwest and South. However, stumpage prices decline as a result.

The last simulation combines several elements leading to low growth rates in timber markets. These assumptions in this scenario include reduced housing demand, log export restrictions, and recovery improvements in processing. The result would be sharply lower demand for timber, although increases in delivered wood costs which are projected in the base case would be moderated (due to the reduction of timber scarcity), somewhat cushioning these demand effects.

Among all the factors affecting U.S. timber markets in the simulations, it is interesting that tariffs on Canadian lumber were found to have the greatest shorter-term effect on increasing U.S. stumpage demand and prices. Conversely, the greatest impact on reducing timber prices (but also on increasing the volume of timber demanded) would arise from intensified forest management.

This impact arises from the resulting increase in timber supply. This result would be due to longer-term effects that would not become evident "until after the turn of the century" (p. 44). These effects, however, are significant in terms of demand increases thereafter, as a result of a lower level of timber market prices. Even though derived from an analysis based on 1979 and 1983 data, a number of relevant implications can thus be discerned from the Haynes and Adams results.

Timber Sale Competition: Mead et al. (1983)

In their 1983 study into competitive bidding for U.S. Forest Service timber in the U.S. Pacific Northwest region for the 1963-83 period, Walter J. Mead and his colleagues adopted a number of tests to determine the degree and effectiveness of bidding at auctions of USFS timber. Among the basic conclusions, supply in the form of timber ownerships in the region was found to be highly concentrated, while on the demand side the market for National Forest timber appeared to have a reasonably competitive structure. Moreover, on the demand side, competition for this public timber had increased markedly over the previous two decades.

To assess the adequacy of competition, a number of measures were adopted. These tests included the relation of bid patterns to changes in the level of U.S. housing starts (as a test of derived demand); the ratio between high bids and Forest Service appraisals; buyer concentration ratios in 10 market "areas" in Oregon and Washington; the structure of the buyer market; the relation of overbids to production cost, average selling value (ASV) and appraised profit; and estimates of bidder participation in both oral bidding and sealed bids. The results are of interest as indications of buyer behaviour. Some results from the testing should be noted.

As to market price indicators, average high bids closely followed the monthly average of the U.S. wholesale price index up to the 1979-81 peak bid period in USFS sales. From that point, bid levels declined sharply, tracking changes in the level of U.S. housing starts.

As to specific influences on bid price levels for the same timber quality, harvesting cost and sale size, bids appeared to factor in the estimates of production cost and average selling value in the Forest Service appraisals. The closest correlation, however, was between bid price and appraised profit. Thus appraised profit was proposed to be substituted for ASV as a "better index of site attractiveness" (Mead et al. 1983:94).

The buyer concentration ratio was a measure of the proportion of sales in each market area accounted for by the four leading, then the eight leading, purchasers. These ratios were found to be acceptable in terms of competition adequacy, with the leading four firms accounting for well below 60 per cent of total purchases in the majority of market areas. Moreover, competition had increased substantially in both Zone 1 (Eastside or Ponderosa pine) and Zone 2 (Westside or Douglas fir) in the region. In Zone 1, sales averaged 2.46 bidders in the 1959-72 period, increasing to 4.14 in 1980-83. In Zone 2, the corresponding results were 4.90 bidders, rising to 6.44.

The study also examined sales characteristics in relation to bidder participation and average bid price. In 1983 U.S. dollars, bidding tended to be discouraged once total appraised value reached $2 million. The great majority of sales, however, were of much smaller value size, with bid price levels influenced by two critical variables: sale size and contract length. Smaller size and longer duration were of positive effect in bidder participation. Average bid price was lower when 'lumpsum' payments were required at the time of sale; higher when the major part of payment was made later at the time of harvest. In this respect, Mead et al. concluded that bid prices were essentially futures prices.

Sales using sealed bids attracted an average of one additional bidder over oral bidding. While the number of non-competitive (single bidder) sales declined with increased competition (to 14% of the total in Zone 1 and 7% in Zone 2), prices in these sales tended to be higher than in competitive sales (Mead et al. 1983:96):

> Non-competitive sales are negotiated sales - the regression analysis indicates that negotiated overbids are higher than competitive ones. This is a curious result and a signal to the Forest Service that "direct" sales are returning a larger premium over the appraisal price to the Federal Government than competitive auction sales.

In sum, for the Forest Service as seller, the greatest returns were generated when bidding procedures, sale size and sale lengths and payment terms were set in accordance with buyer capabilities and preferences. As to overbids over the appraised price, these rose in a positive relation to sale size up to a certain level (but well below the $2 million appraised value). The most significant variable leading to higher overbids in the regression analysis was the log of the number of bidders. Also important was the estimate of appraised profit.

Market Structures and Processes: Scandinavian Research (1985-86)

Studies such as Mead et al. (1983) are based on a large number of buyers, but a single seller, in the above case the U.S. Forest Service. In forest regions with diversified timberland ownership, especially those with widespread smaller holdings by nonindustrial private owners, the buyer-seller ratio is frequently reversed. This condition yields markets in which there may be many sellers operating individually, and a smaller (or even a limited) number of buyers who are able to exercise comparatively more market power.

In consequence, in the mid-1980s, econometric research into timber markets began to focus on the differences between and the effects arising from perfect and imperfect market conditions. This effort was especially pronounced in Sweden and Finland, in which private nonindustrial timber owners account for 50 and 80 per cent of the annual harvest, respectively. Moreover, in such regions, "forests have many owners and are spatially rather evenly distributed" while "mills are often spatially concentrated so that few buyers face many sellers of wood" (Johansson and Lofgren 1985:161).

The Swedish Case: Monopsony and Bilateral Monopoly

As perfect competition is difficult to establish in these circumstances, three types of response can be analyzed. First, a *monopsonistic* (or oligopsonistic) roundwood market will exist in which the market power of the buyer(s) leads to lower prices than would obtain in perfect competition. Second, given the spatial dispersion of the sellers, *price discrimination* between supplying areas can arise under monopsony, in which stronger buyers pay different prices for roundwood, favouring the lower-price area. Third, faced with this inequality in market power, sellers may organize into a union or association to increase their bargaining strength, leading to a market setting of *bilateral monopoly*.

To deal with these types of outcomes, Swedish and Finnish authors developed econometric models of timber supply and demand. These models were based on the assumptions and elements of a competitive market. Thus, in such a market, roundwood demand for a forest products firm is a function of the prices of (a) final products, (b) roundwood, and (c) other inputs (such as labour and capital). Aggregate demand for roundwood in the industry can be summed from the demands of the individual firms (Johansson and Lofgren 1985:163-5).

In the competitive context, supply becomes a function of the supply curves of (a) forest products firms from their own timber and (b) individual private forest owners. This basis for supply and demand could normally be expected to lead to the equilibrium price solutions of a competitive market. In the Swedish analyses, however, prices tended to exhibit a shortfall from the expected results. The problem in achieving a stable equilibrium in the market was found to exist on the supply side, as the private sellers would tend to underbid each other and thus fail to achieve the (higher) equilibrium price level that should have obtained in fully competitive conditions.

In the monopsonistic roundwood market, the market power of the buyer emerges from the combination of relatively even distribution of the forest; a spatial concentration of mills, and often one or two large mills; and transport costs from forest to mill which are "not negligible" (factors also noted for the U.S. South in Binkley 1991). Thus "the local industry gets a spatial monopsony owing to transportation costs" (Johansson and Lofgren 1985:165). Since the objective of the forest products firm is to maximize profits, price and quantity demanded are both lower than in a competitive market, in that price does not equal sellers' marginal cost but rather the buyer's marginal revenue.

In the case of price discrimination under monopsony, the buyer is able to segment the roundwood market into two different non-related submarkets, thus facing the possibility of two different supply price functions on the part of sellers. The objective of the firm is to maximize purchases in the lower-cost submarket. Given this degree of market control, roundwood demand is related to the firm's final product market, and any rise in roundwood price is dependent on price increases for final products.

The bilateral monopoly case arises from institutional features of the Swedish roundwood market. The forest area is divided into five "price" zones. In these zones, organizations representing buyers and sellers, respectively, negotiate annual prices for roundwood. The formation of a single selling organization increases the bargaining power of the private forest owners, at least initially. The bargaining power of buyers can also be enhanced, however, by recourse to a diversity of sources in addition to roundwood supply from nonindustrial owners (Brannlund et al. 1985:595), as buyers within each market area can acquire wood in at least three additional ways. These are: (i) supply from their own forests, (ii) purchases of standing timber (stumpage), and (iii) imports of logs and chips.

The possibility of buying standing timber for sale has been used as a source of supply during the whole period under study (1953-81), while the importation of wood is a more recent phenomenon. In contrast, the bargaining power of seller organizations has tended to diminish (Johansson and Lofgren 1985:173) as individual owners leave the collective group to make their own arrangements. In addition, the selling groups themselves encounter financial difficulties - often due to unsuccessful investments in processing capacity.

Timber Submarkets: Sawtimber and Pulpwood

Cases in roundwood markets are further developed in Brannlund et al. (1985) for Sweden and Kuuluvainen (1986) for Finland. In these studies, a number of other elements are incorporated into the analyses. Both studies distinguish the sawtimber and pulpwood markets. Brannlund et al. (1985) inquire into harvest patterns and relationships between industrial and nonindustrial timber owners to discern qualitative differences in cutting behaviour. Kuuluvainen (1986) introduces stocks of timber or logs held by forest products companies as a new variable.

These two studies establish a more specific market structure for roundwood, consisting of two interrelated markets, in sawtimber and pulpwood. The sawtimber market is competitive. Demand is determined by the prices of final wood products, timber and labor. Supply is given by the prices of timber and cutting costs, but also by the price of pulpwood. This last influence suggests the interrelationship between the two markets (Brannlund et al. 1985: 598):

> The intuition behind the use of the price of pulpwood as a separate argument is that some of the smallwood could be used either as sawtimber or as pulpwood. The higher the price of pulpwood the more smallwood is transferred from the timber market to the pulpwood market. There is, in addition, an effect which stems from the fact that a higher price for pulpwood makes thinning more profitable than before, and this persuades some of the forest owners to carry out a thinning instead of a final felling, which in turn decreases the supply of sawtimber, and increases the supply of pulpwood.

For forest owners, the price of pulpwood is treated as an exogenous variable as the price is determined by major buyers from the demand side of the market. Supply of pulpwood, however, is a function of the price of pulpwood, cutting costs and sawtimber prices, given the two potential uses for smallwood. In the model using 1953-80 data, both sawtimber and pulpwood exhibit about the same supply elasticity (0.6 and 0.7, respectively), in that when roundwood prices rise by 10 percent the supply of sawtimber increases by 6 percent, and that of pulpwood by 7 percent. Between the two commodities, the price of pulpwood has the stronger influence on the other commodity - both from a substitution effect, but also from a negative joint production effect since thinnings result mainly as pulpwood. Too high a price for pulpwood, however, stimulates an increase in the harvest from forest industry lands.

For Finland, Kuuluvainen (1986) introduces the distinction between commercial fellings at a given time and the stock of timber and logs held by purchasers. The reason for this distinction is a difference in price behavior in sawlog and final product markets. Price flexibility and responsiveness characterize the sawlog market, and price rigidities the product market. As a result, raw material stocks held by the sawmill industry are used both to anticipate price changes and to buffer against unexpected changes in final goods demand.

The distinction between timber and product markets is revealed in a number of respects. For example, the short-term elasticity of demand for sawlogs with respect to stumpage prices is (as expected) a negative 0.9 (a 10% increase in timber prices leading to a 9% decrease in sawlog demand); while with respect to final product export price it is positive and larger, a 10 percent price rise reflected in a 13 percent increase in timber demand. The elasticity of supply with respect to timber price is even greater, provisionally estimated to be unusually high at 3.2. Thus, in what Kuuluvainen (1986:15) terms a "preliminary picture" of short-run supply and demand factors, a further influence on demand, price and supply-responsiveness is suggested as a subject for further research, between short run and longer run expectations.

Stumpage Markets in the U.S. South: Newman (1987)

For the U.S. South, Newman (1984) further developed the basis of the foregoing Scandinavian research. In the region, there are two timber markets, termed 'solidwood' (for timber and plywood combined) and pulpwood. Direct substitution is possible between these two primary products. Three inputs are considered: capital, labor and stumpage. As end products trade competitively in national and international markets, final goods prices are determined exogenously for the region.

The forest products firm's derived demand for stumpage is a function of (a) demand for its final product output and (b) the prices of the various inputs in production. The factors influencing the supply of softwood stumpage are more extensive, and include multiple potential outputs (timber and non-timber), long delay between production decisions, potential economies of scale (positively related to timber inventory increases), technological change, large capital inputs, and taxation and subsidies.

The stumpage market at the regional level is characterized as competitive, although at the local level "various degrees of monopsonistic or oligopsonistic power exist." As a regional market, however, the South "represents perhaps the most competitive stumpage market in the country (with respect to active firms participating in the market), if not the world" (Newman 1987: 935).

To test the effect of various influences on this competitive regional market and its solidwood and pulpwood components, Newman's model incorporates stumpage quantity, stumpage prices, final goods prices using real producer prices for (i) lumber and wood products and (ii) pulp and paper, standing timber inventory (defined as growth minus harvest), user cost of capital, and wages. Pulpwood and solidwood stumpage supply and demand are then analyzed separately.

In pulpwood, as also indicated by Kuuluvainen (1986), nonindustrial forest owners are price-takers. Both the "own price" (i.e., pulpwood market price) elasticity and the cross-elasticity with solidwood stumpage are positive but small. Inventory elasticity is much more positive, with a 10 per cent increase in standing inventory leading to a 12 per cent expansion of pulpwood output.

In solidwood, however, the cross-elasticity result of a change in pulpwood price is even lower than the reverse case, although the effect is negative in terms of production. Moreover, in contrast to pulpwood, the effect of an inventory change on solidwood supply is also relatively low. Instead, the significant response in sawtimber supply by elasticity measure comes from an increase in the prices of final goods. As a result, different factors prompt supply responses in the two primary stumpage markets.

These findings also suggest some implications for the future, especially for prices of solidwood stumpage in the U.S. South (Newman 1987: 944-5). The prospect of lower final product demand, reduced timber availability, and the moderating effect of lower demand on timber price increases which would otherwise result from reduced supply, is indicated in other research applied to the region (e.g., Binkley and Vincent 1988, Wear 1992). This matter is revisited in the discussion on the region's timber and log markets in the second chapter.

Timber Market Linkages: Adams and Haynes (1991)

Based in part on research into uncut volumes, prices at times of harvest and other factors in addition to appraised prices and bidding practices (Adams and Haynes 1989), Adams and Haynes (1991) presented an aggregate regional market model for the U.S. Northwest region which incorporated both national forest and other timber. This model also applied in considerable detail the harvest-to-stock relationship discerned in Finnish research. As sawtimber represents fully 90 percent of the region's annual harvest, the two product sawtimber / pulpwood market approach was not adopted, although revenue from sawmill residuals does appear in the appraised price calculations affecting timber demand.

The model includes elements of National Forest Supply, including average bid price; volume not sold as well as sold; the distribution of sold volume by bid-price class and contract length; and uncut volume from previous sales. These and other factors are linked to other public and private timber supplies in the region. Thus (Adams and Haynes 1991:44):

> In earlier research, the initial portions of the (National Forest Supply) process - determining the volumes to be offered, establishing the appraised price, and bidding - have generally received the greatest attention. Our analysis makes clear, however, that the uncut volume inventory forms the actual interface between regional stumpage volume and the National Forest supply process.

This linkage between National Forest and other timber occurs because USFS timber sales involve a form of forward contract. These sales can have durations of a number of years; involve total volumes averaging two to three years of current harvest and sales volumes; and cut volume is influenced by prices at the time of harvest, not just at the time of sale. An earlier paper (Connaughton and Haynes 1983) had established price and volume sensitivity of nonindustrial private timber to changes in the volume of National Forest Sales. The 1991 paper indicates that the effect appears to be reciprocal inasmuch as Adams and Haynes (1991:45) find that short term National Forest supply is more elastic in harvest price than is industrial private supply;

> Our findings suggest that national forest timber harvest in the Western U.S. is sensitive to price in the short term, that it is more elastic than private harvest, and that its elasticity is sufficiently high to explain the opposing shifts in national forest and industrial harvest shares historically observed in western regions.

Even so, uncut volume and its harvest prices act as a moderating influence on the pattern of actual bid prices at timber sales, which are found to be considerably more volatile.

A further element is the treatment of expectations concerning prices. Current bid price, the average bid price of all volume sold, is determined by buyers' expectations for future product prices and costs, and the total volume sold. Buyers have uncut volume under contract from previous sales. Cognizant of bid prices in these sales (Adams and Haynes 1991:20), buyers "must then decide what to bid for timber currently being auctioned. In doing so, they consider potential market conditions in the forthcoming period".

In addition to past bidding and buyers' expectations for market conditions at the time of harvest, the variation in timber sale prices is due to other factors. The first is the diversity of timber quality and operating characteristics among sales, in sale size, species mix, road costs and logging costs, all of which appear in the formula for the calculation of appraised price. The second, however, is the difference in contract length, a factor noted earlier in Mead et all (1983).

From the analysis, a number of characteristics of competitive timber markets emerge, especially as they apply to the behaviour of intertemporal prices (between bid and time of harvest), stock-flow effects (carryover sold volume vs. harvest), and supply from different ownerships (for which also see Jackson 1987). As a result, the model basis progressively developed by Adams, Haynes and their colleagues may also serve as the closest approximation for the competitive supply and sale of a larger volume of public timber in a regional market.

Monopsony Power in Timber Markets: Binkley (1991)

The final paper in this review of individual articles and monographs is based on an examination by Binkley (1991) of behavior and practices leading to imperfect outcomes in a regional market, in this case in the U.S. South. The determination of noncompetitive markets is reinforced by an analysis of its sources, of which two are especially important: transport costs, or "the high cost of transporting wood relative to its value"; and the "significant scale economies and large fixed costs of pulp mills" which create effective barriers to entry (Binkley 1991:2).

As noted in Newman (1987) timber ownership in the U.S. South is exceptionally diversified, the forest industry owns or leases timberland but the harvest provides about 35 percent of annual needs; and demand is characterized by local or area monopsonies or oligopsonies chiefly in the pulp and paper sector. These patterns have created the basis for a number of imperfections and inefficiencies (Binkley 1991:3):

> The general effect of these market imperfections is to keep timber prices below the levels they would be in the absence of the imperfections. The prices actually observed provide the wrong signals to market participants. Too little timber is supplied, particularly by nonindustrial owners, with consequent effects on such socially important variables as mill output, employment, capacity expansion and the choice of production technology. Some land is managed with too little care, and some is managed too intensively ... indeed, no important facet of the forest sector escapes the pernicious effects of imperfect timber markets.

In outlining a "simple theory" of monopsony in timber markets, Binkley (1991:4-6) finds the buyer's solution to rising stumpage prices (even though supply is relatively inelastic with respect to price) arises in the ability to exercise price discrimination between sellers, and thus reduce what would otherwise be a competitive equilibrium price level. Two main mechanisms are available. The first is by means of "spatially differentiated" pricing structures for wood. The second is the use of timber owned or controlled by the company in question to "exert leverage on the open market".

In a perfectly competitive market, Binkley suggests that while standing timber is heterogeneous, it becomes a homogeneous product once it is harvested, cut to length and delivered. Consequently, "identical goods traded at the same time and at the same place should have the same price". Wood delivered to a particular mill from a lower-cost source would be demanded in greater quantity, and less of higher-cost wood. Since a competitive timber market would establish a single delivered price no matter what the origin of the wood, both roadside and stumpage prices for timber stands located at successively greater distance "would fall by an amount equal to the additional transportation costs". Instead, Binkley (1991: 7) notes:

> In the case of pulpwood, the observed spatial pattern of prices rarely if ever conforms to that which is expected from a perfectly competitive market. Two kinds of deviation are common. The first is zone pricing, and the second is uniform roadside pricing.

As general strategies, these practices are not peculiar to the U.S. South. Earlier, in the review of Swedish research, it was noted that larger buyers employ a variety of means to influence supply prices of nonindustrial forest owners in timber and log markets. Similarly, in the South, even where a mill may pay a higher price to a supplier in a more distant zone than it does to one in the closest zone (as Swedish mills import higher-cost fibre), Binkley finds the effect is to reduce total supply costs by the buyer's use of market power in reducing the price paid to the closer (and thus lower cost) suppliers.

If zone pricing involves price discrimination between areas, roadside pricing tends to be uniform (Binkley 1991:11), a practice also observed in Sweden and Norway. The result of Binkley's example is that, even in cases in which average price is slightly higher than that from zone pricing, it is still lower than the price the mill would pay in a competitive market.

The other avenue of market power leverage exercised by monopsonistic buyers in the region is their use of owned or controlled timber to exert control over the prices paid for their open market purchases. The firm will buy wood on the open market up to the point where the cost from this source exceeds the cost of its own timber. (It can also produce from its own sources as long as it can act on purchased wood prices to depress price). Indeed, in the example developed, the average stumpage value of the wood produced from the mill's own sources (in this case 20% of needs) is over four times the price paid to private woodlot owners (Binkley 1991:14):

> Two important points emerge from this example. First, the capacity for the mill to supply pulpwood to itself substantially reduces revenues to private woodlot owners. Second, the mill has a substantial incentive to increase its self-supply capacity. The incentive is particularly great if the mill can secure the self supply through public leases where the initial capital outlay is negligible.

To correct the effects of competitively imperfect practices Binkley suggests a number of remedies. Given the degree of reliance of the pulp and paper industry in the U.S. South on pulpwood purchases from private sellers, these remedies may not translate readily to the timberland ownership pattern and industry structure of another region, in which the predominant fibre input for the industry is sawmill chips. Even so, assuming (because of a forest tenure system) that monopsony or oligopsony power can be extended beyond the shorter-run, what appears in the literature to be a penchant for market power in a number of other regions becomes a matter for serious consideration and review.

Extensions and Suggestions from the Review

The various articles in the foregoing review have been intended to encompass the canvass of work into the economic nature of competitive timber and log markets. They also indicate some imperfections which may impede or distort competitive solutions. Two further comments might be made before cases of regional market operations are reviewed.

The first comment is that for the most part the work reviewed in this chapter has been developed within the context of behavioural assumptions and expected outcomes in microeconomic theory. Recently, however, this theory has been the subject of extension and reassessment, including an examination of what are termed the 'micro-foundations' of microeconomic theory.

The important point for this review is that a number of authors in the field of forest economics (including Paarsch 1989a, Binkley 1991) have begun to adopt this work. In particular, research research into auction theory (e.g., McAfee and McMillan 1987, Milgrom 1987) has direct bearing in timber markets in which auction procedures and bidding behaviour are directly involved. In addition, other applications of further work into bargaining strategies, contracts, market shares (in this case for timber supply), and other direct aspects of market participant motivations and conduct are reported by authors in the field of forest economics.

While this recent work is more elaborate, and beyond the purpose of this study, it is indicative of the directions in which the study of timber and log markets is moving. Coupled with the advances in timber market models reported by Newman and Wear (1990), a considerable body of work has been undertaken that is available for possible adaptation or application to B.C. The fact that timber market models can be constructed by academic and government experts in other regions, generating useful and potentially important results in the process, also suggests a potential resource for further consideration of these matters in B.C.

Inasmuch as the quality of a body of research work expresses the calibre of those who have developed it, a number of suggestions can accordingly be made. The first is that a symposium be convened, logically at UBC but with Ministry support, on the subject of timber and log markets, with invited participants including those who have made significant contributions to the field. The second is that a working group be established to develop the foundations for a timber and log market model for B.C., with recourse arranged (or negotiated) to some of the principal architects of this genre.

As suggested earlier, this timber market model project could be a joint undertaking headed perhaps by UBC and the MoF. In these ways, however, the province could obtain access to expertise in other forest regions in which markets are substantially more developed, while developing approaches and models which could suit it best.

Chapter II
TIMBER AND LOG MARKETS IN B.C. AND THE U.S.

From the foregoing survey of research in the U.S. and Scandinavia, it is now possible to enter the realm of operating markets. In this chapter, four timber and/or log markets are described. These are the existing timber, log or other fibre markets in which the forest products industry engages in the Coast and Interior regions of B.C., and in the Southeast and Pacific Northwest forest regions of the U.S. These markets variously involve a number of transaction mechanisms: negotiated supply, open auction, sealed tender, advance or invited bid, timberland lease, sawlog for pulpwood or chip trades, and spot sales. In the U.S. regions, they also encompass both cash and forward markets.

The juxtaposition of B.C. timber and log markets with those in the two main U.S. forest regions offers contrasts in both fibre disposition for sellers, and the organization of wood supply by purchasers. For producers holding the great part of licensed timber in the province, the Vancouver Log Market and the informal Interior timber and log market represent sources of incremental supply, albeit a proportion which has been increasing in recent years.

In the U.S., the regional markets play a substantially more important role. Except for a few firms with high fibre self-sufficiency ratios, the ratio of "owned and controlled" timber in relation to annual fibre consumption needs is much lower, of the order of an average of 35 per cent in both U.S. regions. These self-sufficiency patterns have been explored in some detail. Even so, it is unlikely these relatively low U.S. ratios would exist were a market not only in place, but also effective. While attention in B.C. has tended to be directed to the neighbouring U.S. Pacific North-west region, it is also the scale and diversity of fibre transaction mechanisms in the U.S. South which are illuminating.

In the following markets review, the summaries of the Coastal log market and Interior informal market for timber and logs will be essentially descriptive. More elaborate attention is directed to the regional timber and log cases in the U.S., as their scope and relative importance yield elements that might be incorporated in a competitive fibre market in B.C.

Explanatory data for the two U.S. regional markets are provided where appropriate in the text. References are cited for readers desiring greater statistical detail. For the B.C. markets, a somewhat more substantial description of the regional tenure distribution of the forest resource, industry structure and market participants may be sought than is provided in the discussion. The charts and tables which form the appendix are intended to provide a basic template for this purpose.

It may also be important to note that, for reasons other than the relative reliance on non-industry supply, the fibre markets in the two countries are not correlates. The essential differences arise from the present patterns of property rights. In the U.S. South, the high proportion of timberland in private nonindustrial ownership, coupled with the holdings of forest products companies, establishes a basis in which governmental involvement in either timber supply or market regulation is comparatively minor. In the U.S. Northwest, public timber accounts for approximately half the total harvest (the National Forests alone for 36 per cent), but on a basis in which timber from public lands is in virtually continuous sale or auction. These arrangements in the U.S. have no parallel in B.C. Thus, in this review, there is no suggestion of equivalence between the existing provincial and U.S. regional cases.

Existing Markets in the B.C. Forest Industry

An examination of the two informal log and/or timber markets in the province offers some exposure to the behaviour of the present active participants who compose them, and the products or services they provide or require. Of a total annual harvest which extends up to 83 million cubic metres (m3) from public and private sources, 29 per cent of the coastal harvest and about 30 per cent in the Interior enters a market in the form of transactions or trades.

In both regions, virtually all the major licensees are involved in the market, as are a number of medium and smaller wood products licensees. These holders of Tree Farm Licenses (TFLs) or Forest Licenses (FLs) have been allocated close to 85 per cent of the annual allowable cut (AAC) from Crown timber. In addition, independent loggers with Small Business Forest Enterprise Program (SBFEP) awards, value added timber holders, and independent sawmills operating with little timber also participate, operating from the balance of Crown AAC. Private timber land owners, farm, ranch and grazing lease operators, woodlot licensees, and others enter the market as sellers from time to time.

Over and above the foundation afforded by timber tenures, market forms and market mechanisms have evolved in both major regions in the Province. These informal systems have established a number of approaches and processes that could serve as precedents for a larger or more formal market regime. For the Coast and Interior, these patterns can be briefly described in turn.

The Coast Region: The Vancouver Log Market

The Coast region of B.C. is composed of the geographic area contained in the Vancouver and Prince Rupert (Coast) forest administration regions of the Ministry of Forests (MoF). The region had a 1990 harvest of 25 million m3 from Crown and private timber combined. The industry based on this resource includes 12 pulp or paper mills, 65 significant sawmills, 9 plywood mills, 55 shake and shingle mills (Nawitka Resource Consultants 1991) and a recently expanding secondary processing and value added wood products industry (Jeffery 1992).

The distribution of the resource is concentrated in the Vancouver Forest Region with an AAC of 23.7 million m3. Of this AAC volume, 21.9 million m3 or 92 per cent of the total is committed in TFLs or FLs. Of this committed volume in these licenses, 19.8 million m3 or 90.5 per cent (or 84.8 per cent of total AAC) is held by the leading eight firms, and fully 70.7 per cent by the leading four firms (Nawitka 1991). The balance of AAC is distributed among independent loggers, value added licensees, and independent sawmills, plywood mills, or other wood products operations.

Together with log brokers, these firms and operators compose the participants in what is known as the Vancouver Log Market (VLM). As a functioning market, the VLM has been in existence for some 70 years. In a submission to the Select Standing Committee on Forests and Lands of the B.C. Legislative Assembly, the Council of Forest Industries of B.C. (COFI) reported a total of 200 buyers, sellers and brokers as active in the VLM (COFI 1989). In considering this number of participants in its subsequent report, the Select Standing Committee commented (1990:12):

> Sellers have ranged between 20 and 30 and buyers have outnumbered sellers by roughly 7 to 1, having ranged between 140 and 180. The significance of this lies in the access to timber volumes held by the sellers.

Consistent data series available for the Vancouver Log Market (VLM) on the B.C. Coast go back 42 years to 1950, although the market has been in operation in recognizable form since the 1920s. These series were assembled on a quarterly basis for the six principal species for the 1950-88 period in a 1988 study (CCG Consulting and Prudential-Bache Capital Markets 1988). Prices for these species (balsam, cypress, Douglas fir, Sitka spruce, Western hemlock, Western red cedar) were calculated in 1987 constant dollars using the GDP deflator. The annual results for the period, for the six species and for their weighted average, were then graphed.

While variances around the weighted average trend for the six species were observed (*e.g.*, spruce higher, balsam lower), the index price pattern was remarkably regular in its form. Real prices rose and fell (as expected) rhythmically with each market cycle, the 1979-80 level representing the highest peak. What was not anticipated was that at equivalent points on the cycle little change in real price was exhibited . Indeed, between the 1950 and 1988 quarters which opened and ended the series (both were peaks in their cycles), the variation in average real log prices was only ten cents per m3.

Two elements, longevity and a tendency to 'norm' real prices, appear to characterize the VLM. While a real price appreciation of timber values was estimated in other forest regions over this period (Sedjo and Lyon 1991), this increase was not manifested on the B.C. Coast. There is evidence from veteran market participants, however, that in certain grade classes volume, average log size and/or quality appeared to have declined.

Size and Nature of the Market

In the 1989 COFI submission, a number of aspects of the VLM were described. These included its historical development, the nature of market transactions, log sale reporting requirements to the MoF, and market volumes. Except that the proportion of annual coastal log production placed through the VLM has risen in the interim (although not the total annual volume), those market elements which were described remain in effect. A recent summary (COFI 1991a) brings the volume trends to the end of 1990. At the time, 29.4 per cent of the annual harvest on the Coast was estimated to be placed in the VLM.

Total Annual Log Volume, 1979-1990, and 1990 Volume Sold and Produced, by Species in the Vancouver Log Market, in cubic metres

YEAR	Sold in VLM	Total Production	Sold as % Produced
1979	3,894,723	30,566,000	12.74
1980	4,253,379	30,713,000	13.85
1981	3,426,254	22,453,000	15.26
1982	3,307,034	21,351,000	15.49
1983	4,108,005	26,846,000	15.30
1984	4,511,964	27,226,000	16.57
1985	6,349,051	27,722,000	22.90
1986	7,116,571	26,561,000	26.79
1987	7,455,827	33,791,000	22.06
1988	8,306,300	32,819,000	25.31
1989	7,627,286	29,940,000	25.48
1990	7,408,830	25,209,000	29.39

1990 Ratios by Species

Species	% Sold
Balsam	22.25
Cedar	44.21
Cypress	55.13
Fir	29.37
Hemlock	21.13
Pine	32.33
Spruce	31.02
TOTAL	29.39

Source: Council of Forest Industries of B.C., 1991

In the COFI submission, two types of transactions were noted: (i) log sales/purchases, and (ii) trade agreements, consisting of log-for-log and/or log-for-chip trades. Not included in the volume or price computations were inter-divisional transfers within companies, log exports, poles and piles, or sales outside the Vancouver market area.

In most respects from this description, the VLM can be classified as an informal, local, 'cash' market - in this case for logs in a particular region. Such a market is unsupervised except for such provisions as the laws of contracts, property and the like; has no fixed or formal location, membership or rules; and compiles no published or circulated reports of listings, quotations or transaction prices. Three meetings with the COFI log market group of company wood supply managers and independent log brokers suggest a greater degree of control and organization than may initially be apparent.

In effect, the VLM is associated with COFI which coordinates it and maintains its summary record of transactions. While it has no membership or specified trading rules, the market is composed of a network of constantly interacting individuals who report that they base their trading decisions mainly on judgement and trust. While it undertakes no public price reporting, COFI does submit a monthly summary to the MoF under Section 149 of the *Forest Act*. These reports enter into a set of 'eligible' transactions in the process of calculating stumpage on the B.C. Coast, although not specifically in terms of price.

Industry Participants and Market Rationale

As its volume share of Coastal log output has risen, the structure of the VLM has tended to be consolidated. While some 200 participants are reported, its transactions consist primarily of trades between the seven major tenure holders who hold 90 per cent of the AAC in TFLs and FLs in the Vancouver Forest Region. These firms are all represented on the COFI log market group, joined by leading log brokers, and by a few of the handful of remaining "independents" in the wood products group on the Coast.

While some of their transactions are not reported, log brokers form the second largest group (although much smaller than the first) operating in the market. The brokerage firms act for the major licensees, and on behalf of market loggers or loggers with SBFEP timber sales. The trade agreements for chips-for-logs between sawmills and pulp or newsprint mills are generally negotiated on a formula basis, plotted formally or otherwise to the selling price of pulp.

Independent brokers associated with the VLM indicate that a descending order of log prices generally obtains between these groups. The highest prices tend to be obtained for logs from SBFEP timber. Open market transactions between independent buyers and sellers (or brokers) rank second highest. Trades between major companies are suggested (although without verification) to tend to be conducted at price levels below those in open market transactions.

For the major integrated firms, the value of the VLM exists in two chief aspects. The first is as an arena or mechanism for reciprocal trading with other large companies operating mainly from their own tenures. This need arises because of the incomplete fit which arises in the Coastal forest between the species, size and grade profile of the harvest and the production and marketing configuration of the mills. The second usefulness arises in the role of the VLM as the major source of incremental supply. Even though fibre in log or chip form is delivered to Coastal mills from outside the region (Interior, North Coast, minor imports from Alaska), logs from independent loggers and private forest land owners are needed to make up a shortfall in AAC in these companies' licenses relative to their plant capacity and operating needs.

At the discussions sessions with the VLM group, many participants volunteered their consumption needs, patterns of supply, and trade requirements. In the three largest companies, MacMillan Bloedel Ltd. , Fletcher Challenge Canada Ltd., and Canfor Ltd., about 50 per cent of their annual fibre needs are consumed directly from their own log harvests. The balance of their harvest is traded with other major companies, or sold on the spot market, with the proceeds used for purchases to round out their wood supply needs. The trades are often in significant volume, and are based on continuous interaction. As examples of matching tradeable logs, recent log trade positions of MB and Fletcher might be cited.

Tenure Holder	Net Buyer	Net Seller
Fletcher Challenge	Small hemlock sawlogs	High grade fir
MacMillan Bloedel	Red cedar High grade fir Hemlock pulp	Hemlock standard

On this basis, the two companies are open to trade high grade fir and standard hemlock logs with each other. For those species and grades for which they are net buyers, they find most of the balance of their needs from other licensees, brokers or market loggers, and dispose of their excess types of logs with other firms participating in the market. For the rest of their net fibre needs (generally originating in their pulp or paper operations) major firms enter into chip-for-log trades with non-integrated and independent sawmills, and make spot purchases through brokers. In this respect, it should be noted that all members in the discussions on the VLM regarded the market as indispensable in their wood supply operations.

Two further but related aspects raised by VLM participants should be noted as indicating an evident evolution of the market. The first concerns a much stronger sense of timber and log valuation on the part of the major integrated firms. This heightened appreciation was stimulated by the log export program - which also involved log brokers and SBFEP loggers - commencing in the early 1980s. As suggested by one discussant:

> The export business suddenly created a sense of value, taught by the Japanese buyers. Log exports came and went, but many people never stopped sorting. Before exports, good fir and average fir went into the sawmill together. Now we are all much more conscious of margins.

The second matter relates to the development of the VLM beyond its traditional spot market status. Changes in customer demand for final products have required a greater degree of refinement of the log material itself. This process involves a combination of trades, the needs of particular end-use customers, a general pursuit of added value originating from the stump, what VLM members regard as "extreme specialization" in log sorts, and a parallel necessity for increased working capital. What is also evident is the development of a secondary market, including a speculative component, and the formation of 'contractual' supply-purchase relationships based on established dealing. What now limits the further transformation of the market is an effective cap on supply.

The Interior forest products industry is generally divided according to the geographic boundaries of the five MoF forest regions, or the three Statistics Canada reporting areas: Northern, Central and Southern. These areas are centered on Prince George, Williams Lake-100 Mile House, and Kamloops-Okanagan respectively. The Interior industry is founded on 10 pulp mills and one newsprint mill, several hundred sawmills (of which 75 operations account for in excess of 90% of annual output), plus what has been an expanding representation from other wood products manufacturing, including perhaps a hundred secondary processing, remanufacturing, or added value plants.

The dominant product in the region is dimension lumber, based on two principal species, lodgepole pine and white spruce. This product is sold chiefly to the U.S. as kiln-dried S-P-F commodity lumber. The subsidiary commodity, also produced by the sawmill industry, is wood chips. This chip supply is essential to the region's pulp mills which have not installed wood rooms in which to process pulplogs. Even though the pulp mills are dependent on residual fibre from the sawmills, the latter (unless owned by an integrated company) asserted in discussions for this study that Interior chip prices net to the sawmills are one-half the price level of what was termed a "world chip index".

Over the last decade, offshore markets for both lumber and chips have been developed by Interior mills, many of whom (although by no means all) market through export sales agencies. In an informal sample of companies conducted during this study, relatively few firms have as yet dedicated a significant proportion of their production to Japan, Europe or other non-North American markets. What has been given more emphasis is the addition of net margin to a proportion of the output by the upgrading of products or by additional processing steps.

An Evolving Timber and Log Grade Structure

In the Interior, the lumber sector is the direct user of the great bulk of the harvest. Unlike the Coast, however, statutory or industrial grading systems have not been established as MoF stumpage charges have been traditionally calculated from end-product sales price data. A marked emphasis towards the production of standard S-P-F lumber from the 1960s to 1980s, coupled with a decline in the real price of commodity lumber, has tended to make quality distinctions in the fibre less important than volume throughput and low-unit cost production.

Even so, industry members state that a considerable and recognized product differentiation now does exist, and that timber and log requirements are beginning to reflect them. In fibre input terms, among these log grades the following are cited:

- random dimension
- treated wood
- studs
- poles
- plywood
- joinery lumber

In addition to these basic distinctions mainly between end-products, investigation has been conducted into the development of grade classes within specific end-product log timber categories. For example, timber cruise information in the Southern Interior has been found sufficient to distinguish six grades for sawlogs on the basis of product yields and widths (Howard 1990). The resulting opportunity for a greater number of sorts and price differentials has already been introduced into some Interior market transactions.

Excess Capacity and Market Growth

In the Interior tenure system, all but a very few companies with licenses have volume quotas in Forest Licenses in Timber Supply Areas (TSAs). When these quotas were originally allocated, they were in a relatively close match with sawmill capacity. Four events, however, have led to a shortfall in wood supply from these tenures in relation to the present level of industry productive capacity.

- The provision in each TSA for allocations to the SBFEP and value added instituted under Section 16 of the *Forest Act* reduced quota volume.
- Increased fibre demand from pulp mill expansion added to raw material pressure for both integrated firms and non-integrated lumber producers alike.
- Capacity expansions were undertaken at a number of sawmills throughout the region, following acquisitions or as new installations.
- The characteristic competitive strategy of the region's lumber industry as a low unit cost producer has required the maintenance of high volume throughout in a mill in order to minimize overhead and labour costs.

As a result, in all three areas in the region, the prevailing estimate is that company tenures now provide not more than 70 per cent of the representative sawmill's annual wood supply consumption, although the range is reported to extend from 30 to 90 per cent. To make up the aggregate requirement, the balance of 30 per cent is obtained in what is described as a 'developing' market-place. The supply sources in this 'market' are stated as follows, with the private and SBFEP components accounting for the major part of non-tenured supply.

- private lands and properties
- small business sales
- woodlot owners
- grazing leases
- federal and Indian lands
- out-of-province (Alberta)

In these transactions, some cash sales occur in established relationships between land owners or small business logging operators as sellers and larger organizations or well-placed local mills as buyers. In other cases, a seller may invite bids in a form of mini-auction, or a purchaser may solicit prices from a number of potential sellers. Purchases may also be negotiated on a contractual basis extending over a period of time. In the majority of cases, the preferred form of purchase is not the log but rather the standing timber - or, as described by one market participant, the preference of the purchaser is to buy "timber on a truck".

Practices in the Interior Timber Market

This Interior market has evolved to the point where larger participants have developed preferences and practices in their external wood supply. Typically, a purchaser will buy a stand of timber and have it delivered by the seller who will perform or contract the cut. Delivery is in log form with a number of agreed arrangements or conditions. The mill gives the seller its specifications as to processing, length requirements, butt and/or top diameters, and sorting. Prices tend to become normalized as a result of the frequency of negotiations or bid auctions. Companies calculate prices according to mill costs, transport charges, and the like; while volume measurement for payment is generally based on the mill scale.

Within the aggregate wood supply, a growing amount of inter-company trading is also taking place. The stated reason for this exchange is that the diameter, length, species and even 'grade' profile of much of the Interior forest can be variable, prompting mills to trade logs on a bilateral or at times a multi-party basis. Those producers which have begun to undertake product or market specialization solicit trades to secure a more consistent supply in terms of wood characteristics or quality. Sawmills also trade with roundwood chippers (who take pulp logs) and plywood mills (who buy peeler logs) in exchange for sawlogs.

As in the Coast region, licensees in the Interior also sell logs as an operating strategy. As reported by these firms, these sales are prompted by a variety of reasons. These causes may include any or all of the following:

- ☐ logs may be oversize (or undersize) for a particular mill.
- ☐ tenure supply may not fit the mill production lines or configuration.
- ☐ a mill may have timber in species it does not process or market.
- ☐ an imbalance in supply may exist between the mill's small and large log lines.
- ☐ lower cost wood may be obtainable elsewhere due to location or operating conditions in tenured areas.
- ☐ Douglas fir peelers are traded for spruce or pine sawlogs.
- ☐ arrangements may be made with specific log home builders, poles, etc.

Unlike the VLM, these various sales and trades are not reported either to the MoF or to the three lumber industry associations in the region. In addition to the reason that the Ministry does not use these timber or log transactions (or their prices) as a basis in calculating Interior stumpage, the absence of a log type and grade structure has made uniform pricing data difficult to compile. What is developing instead is an informal but effective system of valuation, transactions and exchange, involving a variety of fibre forms. In this respect, the Interior market is closer in nature to that of the U.S. South than to the VLM, and the South may provide a better model for more formal application to the region.

Competitive Markets and Supply Diversity in the U.S. South

The U.S. South region comprises 12 states divided into the South-East and South-Central census regions. The region is the leader in annual softwood growth among U.S. and Canadian forest regions, with the shortest rotations. The region accounts for 32 per cent of all softwood annual growth in the combined countries, 40 per cent of hardwood growth, and more than 35 per cent overall.

The annual softwood yield of the South is double that of B.C., the U.S. Pacific Northwest, or the U.S. Inland region, each with about 16 per cent of combined U.S. and Canadian timber production. As a result, the region's forest products industry is the largest in North America. Its annual lumber production of 28 million m3 (mostly in Southern yellow pine) exceeds the 26 million m3 produced in recent years in the B.C. interior. The region has more than three times the number of pulp and paper mills (and an even greater relative capacity) than B.C., and is the major producer of panel boards on the continent.

The original utilization of naturally regenerated pine stands was first supplemented and will soon be matched by new stands of plantation pine. These softwood forests have been increasing, joined by hardwoods, now accounting for one-third of the total harvest, mainly as furnish for pulp and paper (Smythe 1990, Bryja 1992).

The Ownership Pattern of Private Timberland

The region is notable in one other important respect. This feature is the ownership composition of its forest base. Whereas in B.C. the Crown forest accounts for 94 per cent of all commercial timberland and private owners for six per cent, in the U.S. South the proportions of the public and private categories are almost precisely reversed, with 90 per cent in private ownership and 10 per cent in public lands.

Moreover, the distribution of the 90 per cent in private holdings is exceptionally diverse, with the forest products industry holding much the smaller share. Of all North American forest regions, this timberland ownership structure most closely mirrors that in Europe. In the last major 'census' of the region's timberland reported by the U.S. Forest Service (1988), the various public and private holdings were as follows:

Distribution of Timberland Ownership in 12 Southern U.S. States, 1984

OWNERSHIP CATEGORY	Area in 1000 Ha	Percent of Total
National Forest	4360	6 %
Other Government	2931	4
Forest Industry	17104	23
Nonindustrial Private:	49326	67
of which:		
Agricultural	*16063*	*22*
Corporate	*6546*	*9*
Other Individual	*26717*	*36*
TOTAL	73721	100

Source: U.S. Department of Agriculture, Forest Service, 1988.

The timberland total of 73.7 million hectares (ha) is defined as forest lands capable of producing an industrial timber crop and not withdrawn for other use by governmental regulation. This commercial forest area covers 55 percent of the total land area of the 12-state region, as opposed to about a quarter of the total area in B.C. The striking aspect of the distribution in the table is the comparatively low proportion accounted for by the forest industry. This category includes both "owned" or fee simple lands and "controlled", held in long-term land leases which may extend from 20 to 60 years.

In addition to the low proportion of public lands (6% federal, 4% state and other), what is also striking is the nonindustrial or "other private" category accounting for 67 per cent of commercial timberlands. This ownership group consists largely of farmers and non-farm individual or family owners. The remaining portion is held by corporations which do not own or operate wood processing facilities. These nonindustrial forest holders include utilities, railroads, insurance companies, banks and hunting clubs. In the last decade, the role of investment entities and financial funds has increased with the sale or transfer of large timberland holdings of major forest products companies in the region to pension funds, insurance institutions and master limited partnerships (MLPs).

Increasingly, however, it is the category of forest industry-owned or controlled lands which have become more important in relative terms. In operational terms, these lands form the base core of fibre supply for companies in the forest products industry. A land acquisition program for pulp and paper mills in the last three decades led to the development of fast-growing pine plantations. These forests are now growing at much faster rates than the naturally regenerated stands in the Other Private category. The ownership pattern may be summarized briefly.

- The *Forest Products Industry* tends to manage its lands for maximum profit. Over the past 30 years forest companies, especially in pulp and paper, have carried out extensive programs of natural stand harvest and conversion to plantations, using management treatments of intensive silviculture. The increase in plantation stands was most rapid between 1952 and 1985 as these units rose from 2 to 31 per cent of industry holdings. During the period as well, the hectares owned by the industry increased by 27 per cent.

- The *Nonindustrial* or Other Private group ranges from very large holdings which are managed as intensively as industrial lands to many very small parcels which tend to lack adequate management. Management and treatment applications often fall well short of industry standards, and many tracts are entirely neglected. As an indication, plantations have increased from only one to five per cent of total holdings in this category, and the total area of nonindustrial forest land has decreased.

- In the *Federal and Other Government* category, lands tend to be managed according to various multiple-use mandates. These lands contain significant areas of low site productivity, and often emphasize water conservation, recreation and other non-timber uses. In this combined category, plantations make up only five per cent of the total area.

Timber and Log Transactions by Source

Given these patterns of timberland ownership and control, the market has involved a large number of corporate, farmer, individual, and forest industry owners, engaged in a variety of types of land-related or fibre-based transactions. The various arrangements in timber sale transactions may be outlined by ownership or control category. A summary of log market practices is also included. Some of these methods will be familiar to a B.C. context. Others will not, but may be adaptable to the province in a market-based regime.

- Forest Industry Timber

  As noted, industry lands form the core basis of annual fibre needs. Thus, most companies process a large portion of their harvest volumes. However, significant sales of standing timber are made by *pulp and paper* companies to *solid wood products* manufacturers. Typically these sales are negotiated at current market prices and include agreements to purchase chips, also at the current market price. Other methods for these timber sales such as sealed bids are also used according to the company's wood needs and forest production situation.

While there is no official or systematic basis of reporting transactions, these price levels (and any directional movements in prices) can be estimated by market participants. One source consists of price and volume reports in privately-owned timber market letters. Another is the development of extensive networks and the informed knowledge which is thus accumulated by market participants.

❑ Nonindustrial Private Timber

The *large private owners* sell standing timber through competitive bidding and negotiated sales. The latter may be short-term sales of specific stands or longer-term contracts with specific stands designated from time to time. The long term contracts are price-adjusted through negotiation, and may sometimes be indexed to market indicators.

In other arrangements, some large private owners have leased their lands to *forest products* companies for periods from 30 up to as many as 99 years. The leasing company agrees to manage the lands, harvest the wood, and return the lands stocked with growing timber. Payments may be on a per acre or unit volume basis, or some combination of the two. These leases are now much less common than in earlier decades.

The *small land owners* sell through negotiations to a wide variety of buyers. Alternatively, they engage forest consultants to conduct sales, with advance advertising and notification to interested prospective buyers. Purchasers include the large companies, *independent loggers*, and *pulpwood dealers* who in turn contract to loggers. In recent years, the number of bidders at these sales has been rising, to the point where up to 12 attendees is not uncommon (Colberg 1992).

❑ Federal and Other Government Timber

Timber sales from *federal* and *state* lands are sold by competitive sealed bid, or at oral auctions. As the successful bids are reported, these sales serve as a market indicator of both demand and price. Given the relatively minor importance of federal and state timber in the region, the indicator may reflect incremental wood demand. As the sale methods are similar to those in the U.S. Northwest, they are more fully described in the discussion on that region below.

❑ Log Markets in the Region

Log markets in the U.S. South involve many participants. The large integrated timber-land owners log with company operations and *logging contractors*. Logs suitable for company facilities are processed internally, with the rest sold to other processors. For example, a paper company with limited solid wood capacity typically uses all its pulpwood, selling the saw and veneer grade logs to local mills. In exchange, these mills usually sell their chips and pulpwood to the paper company.

In addition, *independent operators* buy or bid for timber sales, then log and sell to a variety of users according to the best prices offered. Independents may work closely with manufacturing companies, becoming an extension of the company's wood procurement program. Market observers report that the 'short' log market (i.e., bucked to 16 feet in length) has been largely replaced by tree-length delivery to mills, suggesting a phasing out of the region's traditional log market (Colberg 1992).

A notable outcome appears to result from the region's diversity of arrangements and approaches. In contrast to cyclical patterns in other regions in the last 15 years, price trends for stumpage in the U.S. South have been remarkably stable. The most dramatic comparison occurred in the 1977-85 period when timber prices in the region moved in current U.S. dollars per m3 from $12 per m3 to a high of $18, then settled back to $16. In the same period, the movement in the U.S. Northwest (for example in state timber) was from $29 per m3 to $60, then $20. The opening and ending prices in the South essentially matched factor cost inflation. Prices in the Northwest rose well above the inflation rate, then plummeted below the 1977 level.

These patterns indicate a marked degree of price stability in a highly competitive environment. In part, the large proportion of pulpwood - close to 50 per cent of the total harvest - may be a price-regularizing influence, possibly because of area market structure (Newman 1987, Binkley 1991). A further stabilizing factor may be the market orientation of the southern pine lumber industry, in which 50 per cent of lumber production is sold as or for treating. The diversity of supply sources may also be a contributing factor in moderating excessive fibre price swings. Even if this diversity cannot be replicated on an ownership basis in B.C., it is still a model for a range of tenure arrangements and the types of participants who might become involved.

The Pacific Northwest: A Public/Private System

For this study, a more detailed review of fibre markets in Washington and Oregon was undertaken for several purposes. First, these two states most closely resemble British Columbia in forest types, operating conditions, and finished products markets. The region is also divided into two major geographic areas: the Douglas fir zone ("wet belt" or "west of Cascades"), and the Inland zone ("dry belt" or "east of Cascades"). Second, the U.S. Northwest and B.C. forest harvests and annual output volume are approximately of the same scale. Third, both regions have been subject to much the same cyclical behaviour in harvest levels, production, prices and employment.

Ownership Patterns and Management Approaches

The ownership patterns of commercial timberlands, and the proportional harvest utilization from each category, differ from those in the U.S. South. In the Northwest, the order of relative importance starts with federal lands, and proceeds through the lands held by the forest products industry, nonindustrial private owners, and state and other governments. The ownership distribution can be summarized as follows.

Timberland Ownership in Washington and Oregon, by Category, in 000s Hectares, 1990

OWNERSHIP	Washington		Oregon		Total	
CATEGORY	Ha	% Total	Ha	% Total	Ha	% Total
Federal	2,246	32	5,605	58	7,852	47
Other Government	922	13	505	5	1,428	9
Forest Industry	1,858	26	2,166	22	4,024	24
Other Private	2,011	29	1,351	14	3,362	20
TOTAL	7,038	100%	9,628	100%	16,666	100%

Federal agencies and private ownership each control just under one-half the land. State lands account for most of the "other government" category. The privately owned timberlands are divided between 24 per cent of total timberland under industry ownership or control, and 20 per cent classified as "other private" or nonindustrial. The latter category ranges from many small woodlots to a few large holdings owned by investment groups. Most of the industry lands were acquired early in the century and carry very low book values. The various ownership groups may be suggested as follows.

Federal Lands

The U.S. Forest Service and the Bureau of Land Management are the two important federal agencies managing timberlands in the Pacific Northwest. They operate under legislative mandates which set forth the major policies, objectives and guidelines for managing and marketing timber from the resources base. The agencies operate under expense budgets, but have no overriding revenue or financial rate-of-return objectives. Economic criteria do play a role, however, in expenditure areas such as silvicultural treatments and other management activities.

Other Public Lands

This category consists mainly of lands owned or managed by the states. The Oregon Department of Forestry manages state timberlands as trust county lands and for common school support. In Washington, state lands are managed by the Department of Natural Resources for several school trusts. The department's constitutionally mandated charge is to maximize net income to the trusts while conserving and enhancing the natural resource base.

Forest Industry Lands

The forest products industry manages its timberlands to maximize profit. This objective is often pursued in a longer-run context in which 'target', 'high yield', or 'intensive' forest management is applied (Hee 1991) on a basis consistent with maintaining and enhancing the long term productivity of the asset base, and within the laws regarding water, wildlife and other forest benefits.

Non-industrial Private Lands

Because of the heterogeneous nature of this ownership group, there is a wide range of owner objectives. Large-scale investors manage their lands much like the industry does. Smaller ownerships such as family farms, absentee owners and the like may actively manage for timber production; passively hold for undefined future purposes; or hold for passing on with their estate. As a group, these owners respond to market conditions by selling greater volumes during strong markets and reducing sales in weak markets.

Harvest Levels and Wood Source Patterns

The annual average timber harvest for the past five years has been of the order of 85 million cubic meters, about the same volume as the annual cut in B.C. from Crown and private lands during the same period. Variances in two product categories excepted (panels and export logs), the utilization pattern from the harvest is also similar. Approximately 78 per cent of the harvest volume is processed in 222 sawmills, 95 panel plants and 17 pulp and paper operations. The remaining 22 per cent is shipped in log form to off-shore markets. A marked difference arises, however, in timber prices. The total value of the 1990 annual harvest on the stump in the U.S. Northwest was estimated to be about US $2.3 billion, an amount which converts to US $27 per m3. In Canadian dollar equivalent, this level was close to four times the level of Coast stumpage in B.C.

While combined private holdings account for 44 per cent of the commercial timberland area in the two states, they provide 53 per cent of the annual harvest. There are no published figures which show the forest industry's sources of supply for all ownership types, especially the other private category. The Western Wood Products Association reports sources for their sawmill members in the two states for three categories: company owned, federal, and other land. In Washington, an approximate balance exists between industry, nonindustrial, federal, and state and other. In Oregon, federal lands account for 54 per cent of the annual harvest and industry lands for only 19 per cent.

More complete data for the 1980-90 period from USFS, state and industry association sources were used to trace year-to-year variations in harvest volume on both private and public lands in the region. In western Washington and Oregon, in which private timberlands (both industry and nonindustrial) provided 59 per cent of the 1990 total harvest, the greatest increase in volume from one year to another was 20.6 per cent, and the next highest 9.5 per cent. In decreases, the largest year-to-year decline on private lands was only 11.9 per cent, and that at the end of the period from 1989 to 1990. As to change over a market cycle, the annual harvest rose 36 per cent from the 1981 through to the 1989 harvest peak, with year-to-year changes (up or down) of less than 10 per cent.

In contrast, the pattern in the public lands was irregular. For example, on federal lands in western Washington and Oregon, the annual cut doubled between 1981 and 1984, and fell by more than one-half between the 1988 peak and 1990. By the end of the decade, declines in both log exports and domestic lumber demand affected harvest levels on both private and public lands. Even so, over the whole of the decade, it was the private lands which were harvested on an essentially consistent basis.

The swings in public timber harvest volume over high and low points in a pronounced timber market cycle suggest the role of federal and state timber as one of a surplus, reserve, surge, opportunistic or incremental source of supply. For forest products companies owning or leasing a part of their raw material needs, public timber appear to be supplemental to the base component of forest industry and other private lands. This indication of substantially greater variation for federal lands was observed by Adams and Haynes (1991) in the previous chapter.

Market Participants and Competitive Methods

These ownership and utilization patterns carry over into the organization of wood supply for converting mills in the wood products and pulp and paper industries. As in B.C., the lumber sector is the largest user group of round logs, while plywood plants have similar sourcing methods. In turn, the pulp and paper mills rely largely on chips from the primary wood product manufacturers.

In addition to a basic level of supply from their own holdings, U.S. Northwest producers must secure an average of more than one-half of their annual wood needs from the other private, federal and state categories. As a result, a large and active market exists for both timber and logs. The standing timber and log market is made up of a wide range of players participating in a number of ways. Some examples best illustrate the scope of participation:

- *large integrated companies* with significant timberlands which utilize their harvest in their own plants, sell logs into export and domestic markets and purchase additional volumes of standing timber from public and other privates sources;

- *medium and small companies* with relatively limited timberlands which use their fee timber as a hedge against shortages during periods of tight supply and as a source of low cost timber during poor markets;

- *manufacturing companies* with no timberlands which rely solely upon purchased timber and logs to meet their needs;

- *logging companies* which compete for public and private timber sales and merchandise their log production to export and domestic markets;

- *export companies*, such as the large trading companies and smaller traders, which purchase standing timber and logs for export to their customer overseas.

From this group of market participants, the discussion is intended to describe the forest resource, its administration, and management as pertains to the marketing.of standing timber and logs. These two commodity categories will be reviewed in turn. Reference data are contained in the tables and charts forming Exhibit III-1. The reviews will follow the sequence of the ownership distribution cited earlier.

Timber Sale Policies and Practices

Federal Timber

Federal timber sales average 17,000 m3 and have contract terms of two to three years. In recent years the volume size of these sales has declined as operating restrictions have tightened. Several years ago sales averaged 45,000 to 60,000 m3. In recent years the uncertainty generated by environmental issues has caused the Forest Service to reduce average sales size to amounts which can be cut in two or three years. In addition, many earlier sales required heavy investment in roading to open up new areas; thus larger volumes in these sales were needed to pay for the roading. As most areas are now roaded, these costs have declined.

Timber sales are sold through a two-stage bidding process. In the first stage, sealed bids are submitted along with a security deposit (set by formula) of 10 to 20 percent of the bid amount. At the second stage, bidders meeting eligibility standards are notified and the group enters an oral bidding process to determine the winning bidder. Anyone financially qualified is eligible to bid on federal timber sales except individuals or companies involved in log exports. Bidders must submit audited financial statements and projected cash flows to demonstrate they will be able to operate the sale within the term of the contract. Sales may not be conveyed to others except when the winner is going out of business or selling the company.

In addition to the deposit, the balance of the purchase price is paid according to scaled volumes removed from the sale area. During the term of the contract, stumpage is adjusted using the Western Wood Products Lumber Price Index. Developed from price data on species and grades from 300 participating companies, the index is published monthly for both Inland and Coastal regions.

Stumpage rates are adjusted quarterly with adjustments being 50 per cent of the upward movement and 100 per cent of the downward movement. There are also limits in how high or low the stumpage rate can be adjusted. The Forest Service also has a small business set-aside program. These sales are designed to assure a certain volume of the total program is reserved for businesses which have 500 or fewer employees. For the past five years, 20 percent of total sales have been in the small business category. The federal government has banned the export of federal timber and restricted the resale of federally sourced logs since the early 1970s. The log harvest from federal land must be processed in the U.S.

State Timber

In both Oregon and Washington, timber sales on state lands average 17,000 m3 and have contract terms of two to three years. All sales in Washington and most in Oregon are by sealed bid. Typically there will be five bidders on a sale; the range may be from one to ten. Usually the bidders are in the room when bids are opened. The bids are read aloud and results can be obtained by non-bidders upon request.

Both scale out and lump sum sales are made, but the trend is toward lump sum. Bid deposits of 10 to 20 percent are required. The balance is paid according to scaled volume removed in the case of scaled sales, and on proportion completed on lump sum sales. The states do not index the stumpage rates to the finished product markets as the U.S. Forest Service does.

Washington State timber was exportable until 1990 when the U.S. Congress enacted the *Forest Resources Conservation and Shortage Relief Act* allowing states to ban the export of state-owned timber. At present only the harvest from Alaska and a maximum of 25 per cent of the timber sold in Washington can be exported. For its part, Oregon has banned the export of all state timber.

Forest Industry Timber

Forest products companies utilize their own timberland harvests for three purposes: (i) for processing in their own mills; (ii) to sell standing timber and logs to other local companies; and (iii) to export. The amount of timber processed vs sold as standing timber or logs varies greatly according to the company's objectives and strategies. Some companies with limited holdings use the timber as a supply hedge to support their public timber bidding programs. At the other extreme, companies with extensive holdings compared to their own wood needs sell most or nearly all of their forest harvest as standing timber or in log form.

Non-industrial Private Timber

A few of the larger timberland owners manage and sell their timber in ways similar to the operating companies. However, much of this category of timber is in small parcels owned by farmers and small investors. Often this timber is sold through negotiations with the full range of buyers already discussed.

The U.S. Northwest market for standing timber is highly competitive. Many bidders compete for timber sales and constantly seek ways to improve their market returns in order to successfully purchase sales. Timber buyers also work with other companies in various ways. For instance, a logging company may have relationships with both exporters and mills so that prior agreement on log prices can be obtained before bidding on a sale. The logger thus knows he has assured outlets and known prices for all or most of the log quality categories on the sale. He may also receive financial backing from his buyers. Other bidders prefer to purchase sales and work the spot market to get the best price over the period of the sale.

Cruising and appraisals are intensive, and buyers often bid prices equal to or higher than their current break-even if logged at the time of sale. Since sales commonly run two to three years, operators often work to balance their operations according to market conditions. Given this level of competition, it is common to find defaults during falling markets.

In a general sense, the market is divided between exportable and non-exportable timber. Premiums in export prices indicate the importance of log exports within the region in the 1980-90 period. The influence of export markets on private and (until recently) state stumpage prices contrasts with generally lower values in federal timber sales. In the case of the non-exportable federal harvest, the level of domestic housing starts, lumber production and lumber prices have a greater bearing on U.S. Forest Service stumpage values.

In the Northwest, prices are reported on a less proprietary basis than in the South. The U.S. Forest Service provides extensive statistics on production, employment, prices and trade in the forest industries on a quarterly basis (e.g., Warren 1991). These publications include reports on volume sold and average prices at National Forest timber sales, and from other federal and state lands. The report also includes average quarterly stumpage prices for the Northwest region for the 11 leading species and a species composite. In addition, industry associations and forest industry trade journals also provide regular price reports.

Log Markets in the U.S. Northwest Region

The Pacific Northwest log market is made up of a multiplicity of players carrying out a wide variety of transactions. Unlike the public timber market, there are no formal organizational elements and no required reporting. What little published log market information exists comes from several private publications that sample participants in the market.

While there are "official" grades established through the cooperative scaling bureaus, in practice most participants deal with a wide variety of "sorts" which go well beyond the standard grade descriptions. Major buyers for the export markets such as Weyerhaeuser, ITT Rayonier, Murray-Pacific and others establish sort descriptions which they circulate to their suppliers. Comparison of these descriptions shows similarities within basic species and quality categories, but each is different thus reflecting the company's customer base and marketing philosophy.

Large exporters such as those cited earlier maintain log sorting yards where they process their own timber and receive logs from any supplier willing to deliver logs which meet the company's sort specifications at the offered purchase price. Offering price lists are usually available from these yards; negotiations with suppliers, however, is also common. Some of the trading companies and independent exporters also operate log yards similar to the integrated companies.

Sellers such as independent loggers shop the buyers to find the best price for the type and quality of logs they are producing. The large companies also sell to one another to balance out orders or spin off certain sorts for which their customers have little interest. Domestic mills participate in the log market to supplement timber from stumpage sales they have purchased, or to dispose of logs that do not fit their mill. There are also mills which prefer to deal in the log market for most and sometimes all of their wood needs. These are usually specialty mills which target specific log species and qualities to meet niche markets they are serving. Varying market conditions, changes in the resource base and the entry and exit of participants makes the log market highly dynamic.

Market Approaches from the Regional Models

The concern in the type of research summarized in the literature survey has to do mainly with the whole of a market, the determinants of its outcomes, and the relative degree of competitive efficiency within it. The perspective of the foregoing market review is one primarily of the forest industry and its relation to public timber, other private sellers, and its own timber. While a general context of the regional market has been outlined in each case, the underlying inquiry has been into the ways in which companies operate in the acquisition of their supply.

While the two B.C. regional markets are the ultimate subject of this study, it is rather the U.S. markets which have a greater bearing. In a market context, the principal effect of the assumptions as to the redistribution of the harvest given by the Commission would be to change the way in which the forest products industry in B.C. organizes its wood supply. Such a basis is much more complex than that adopted by firms in the industry now. Among other respects, this greater reliance on a market establishes a strategic role for the timber that firms in other regions do own or control, a factor found both in the literature survey and in the foregoing U.S. market reviews.

The role of this forest industry 'core' supply is evident in the relatively small variations in the annual harvest from it on a year-to-year or cyclical basis. If the total pattern is reasonably representative of the typical firm, the forest industry regards public timber (at least in the U.S. Northwest) as a source of variable supply. This irregularity in the sale of public timber also occurs on a seasonal basis. For example, in an examination of monthly changes in National Forest sales over a period of years (Haynes 1991), a bunching of more than one-half of the sales in four months of the year was evident. Part of this monthly and seasonal difference may be due to USFS sales timing. Yet a part appears to be due to buyer interest, and to harvest activity on private lands.

It is also evident that firms in the forest industry, be they large, medium-sized, or small, tend to seek a variety of sources. For the part of their needs they do not control, they use a number of supply sources in the market. In addition to bidding at federal or state timber auctions, they may enter into timberland leases or harvesting contracts. They may negotiate take-or-pay supply agreements with timber holders, or buy farmer, rancher or developer wood. They also make spot purchases from market loggers, timber brokers or pulpwood dealers. They trade logs with other integrated or non-integrated firms; enter into chip supply contracts; or swap logs-for-chips.

A number of these practices now take place in the B.C. markets. Yet, in other more well-established markets, the range of alternative fibre sources is substantially more diverse. In part, a greater spectrum of options is due to the existence of four categories of 'product' in the market: land, timber, logs and chips. The last three sources are available in the province, but not the first. Yet, because of the existence of private timberland, the combination of (i) active purchasers and (ii) secure property rights invites the involvement in the market of financial participants, such as insurance companies, pension funds, and master limited partnerships, by way of investment in timber and land.

For the purpose of the discussion in the third chapter, a number of the measures used in the sale or purchase of fibre will be carried forward from this review. The definition of a timber and log market which is perhaps apparent from the first two chapters may also provide a background or framework on which the formation of a B.C. market can perhaps be more clearly traced.

Chapter III
IMPLEMENTING A B.C. WOOD FIBRE MARKET

Literature, Regional Models and a Market: A Recapitulation

To this point in the study, there has been a review of relevant contributions to the literature on timber and log markets in forest economics and the economic theory of natural resources. There has also been an examination of timber and log markets in four forest regions in British Columbia and the United States. While regional timber market models formed the basis of many of the articles and monographs in the literature review, the survey was directed to a generic market framework. In the actual regional cases, however, the emphasis was placed on the various market participants (sellers, buyers and intermediaries), and the ways in which they function and interact.

The task of this third chapter is to set out specific changes and recommended measures and approaches for timber and log markets in B.C. This discussion is based in large measure on findings from the literature and market reviews in the two previous chapters. It also draws from a series of 30 discussion sessions involving a total of 150 forest industry members in B.C.

In the exposition, the two primary products are mainly found to be components of essentially the same market in which timber and logs are joint or optional outputs. In other aspects, they will be treated as more distinct. The form and functions of a market in primary forest products can be derived from the research and cases studied. The market examples and the description sections in the literature selections indicate how markets work, and the motivations and approaches of the buyer and seller participants who comprise them. The articles and monographs summarized in the literature survey suggest how markets function in a competitive paradigm, and the market practices or conditions which can impede the process of arriving at competitive solutions.

While these reviews provide a foundation for recommended approaches, they do not offer a sufficiently complete basis for solutions. Some major differences between B.C. and the other regions encountered must be acknowledged. The assumptions given to the study also have a bearing. In addition, the constituent industries and categories of market participants require a degree of definition. Finally, from further evidence in source material for the reviews, specific elements involving buyer and seller behaviour and requirements in a market need to be acknowledged.

From this more complete background, organizational, operational and procedural elements for expanded timber and log markets in B.C. can be proposed. These approaches are those which emerge from the scope of the study to warrant more particular consideration, given the forest land ownership pattern in B.C. In the same section, a series of implementation steps is outlined, intended to facilitate the early introduction of a market in primary forest resources of the province.

It should be noted that the introduction of a large, competitive market based on a dominant and continuing Crown forest ownership has not been attempted before. Timber markets elsewhere have evolved from a much more diversified distribution of property rights, or state timber has been sold or privatized. These alternatives are not provided in the assumptions given to this study, although to the extent possible private sector elements are incorporated. Thus the proposals in this chapter are not claimed as furnishing complete solutions. What they are meant to offer is a framework for a start.

While the reviews offer important guidance, there are certain differences which must be considered between markets in the U.S. and Scandinavia and those in B.C. The most significant of these features is the composition of timber ownership. In the other regions, private timberland provides between 50 per cent (Pacific Northwest) to 75 per cent or more (Sweden, Finland, U.S. South) of the annual harvest. In B.C., public timber owned by the provincial Crown occupies 94 per cent of the commercial forest land in the province. This resource also provides the province with a significant part of its general revenue.

This concentration of Crown ownership affects any framework for a timber and log market in B.C. In the other cases, what exists are mainly private markets. The role of public timber within these private markets is as a component of supply. Thus, while national or state governments own timber and conduct public timber auctions or sales, the largest number of transactions occur among private sector participants, whether forest products companies or forest owners. The market which results operates without government supervision or control. Even in Sweden, where institutional market features have included bargaining consortiums of industry buyers and of private nonindustrial sellers (reviewed in Johansson and Lofgren 1985:187-8), intervention by the state in the operation of the market has been relatively limited.

While there are statutes and formal processes for public auctions of federal or state timber, all other transactions involving private buyers and sellers are conducted by the normal rules of business, governed by the legal system of the state. There may be accepted rules or conventions - of grading, scaling, bidding, pricing, payment, and conduct - in each market, some of which may be institutionalized. As a result of this diversity in property rights to the resource, however, public timber and private markets can effectively co-exist.

Yet, if the bulk of the province's forests are public, how is a private market to be established, in order that this same co-existence can be accomplished in B.C.? The two simplest solutions are those advocated by many industry proponents. One is to privatize the resource (or at least a large component of it), and thus harmonize a private market with a resulting large block of private timber. The other is to maintain the present tenure system, but to cede market operations and control to the market participants themselves, trusting to the law and to competition to protect both private and public interests.

Given the importance of the public forest, a purely private, unsupervised market as advocated these proponents is not recommended in this study. Yet, it is necessary to recognize that the evidence from the reviews clearly indicates that greater gains in industry efficiency and economic welfare can be obtained from relatively unimpeded competitive markets than a market directly regulated or operated by government. This supervised market has been proposed in a number of public inquiries, whether as an official B.C. Timber Authority or a B.C. Log Market (e.g., Task Force on Timber Disposal July 1974:129-35, Royal Commission on Timber Rights and Forest Policy 1976:295-305, Select Standing Committee 1990:12-14). In light of evidence of private market efficiency, this directly regulated approach cannot be recommended either.

Thus, in this study, a combination of a self-regulated market organization coupled with oversight by a provincial regulatory agency is proposed. In this context, self-regulation means the licensing or delegated authority by a legislative body to an industry or a profession to conduct the operations of a market, to establish and maintain standards, to formulate rules of procedure and conduct, and to monitor and discipline violations or misconduct of these rules. Typically, there is a government regulatory or licensing agency which provides an oversight to the industry. This oversight generally includes periodic reviews, intervention in serious cases or disputes, or in extreme cases the power to recommend the withdrawal of the self-regulation privilege itself.

By these means, an essentially private market is provided. At the same time, protection of the public interest in the resource can be ensured. In the case of forest resources, the participants in such a market - the members of the forest industry taken as a whole themselves - would have a decided interest in ensuring the maintenance of probity and trust, both in the market and among its member participants.

Marginal Supply vs. Market Reliance

A second difference between B.C. and the other forest regions encountered in the reviews is the substantially greater importance of "market" wood. A greater conformity with the "market" proportions in other regions would be the result of the Commission's proposals, but there are implications for a process of change which would arise. Among these would be a need for industry participation and involvement in this process.

The change is not as great as the degree of market reliance in other regions, but is still substantial. In the U.S. South, public timber and nonindustrial timber and log supply account for 65 per cent of the forest industry's annual requirements; in the U.S. Pacific Northwest and Sweden, the proportion is 75 per cent; and in Finland it is in excess of 80 per cent. In B.C., as indicated in the reviews of the Coast and Interior markets, the ratios are reversed. "Market" wood, composed of nonindustrial private sellers and market loggers operating on Crown timber sales, and excepting inter-company trades, appears to provide up to 25 per cent of the industry's annual wood supply needs in the Interior, and perhaps 20 per cent on the Coast.

In B.C., even though industry association members assert the existence of a 'large, competitive' market, the development of a functioning market can be characterized as incomplete in comparison with these other regions. In terms of total wood consumption, timber and log markets in the province exist essentially at the margin. The shift from a market as a source of incremental supply, to reliance on a market for a major part of supply, is one which would not only be unfamiliar for most operators in the province, but would also involve different strategic approaches than those which are now pursued.

As a result, the more the operations of a larger-scale timber and log market can evolve from existing practices and processes, the less disruptive might be the effects of its implementation. While the approaches to market operations in the recommendations borrow from the cases examined, it is proposed that these be developed by a task force composed of market participants, for discussion Ministry authorities and with the provincial regulatory agency that is selected to give a general oversight to the market.

There is also the matter of possible market imperfections. Examples of unequal market power, local market monopsony, potential barriers to entry, and collusive behaviour in timber bidding have been noted as arising in other markets. These cannot be entirely prevented. Even so, techniques and measures which appear to foster competition, and inhibit non-competitive behaviour, are adopted in the recommendations. However, in terms of specific measures, the emphasis is also placed on what has been found to work, and to work better than alternative approaches.

Forest Commission Assumptions Affecting Market Structure

The proposals and recommendations are also influenced by the assumptions given by the Forest Resources Commission to this study. Among these assumptions, a wood fibre market would be established in B.C. The products in this market would be standing timber and logs. Markets would be established, or further developed as appropriate, for both Coast and Interior regions, or in the case of the Interior by subregions.

Fully one-half of the annual harvest would be sold through the market, although this assumption does not specify whether 'harvest' means from Crown forests only, or from the combination of Crown and private forest lands. Of non-industry supply, part would come from Crown-administered lands, and the balance from a new category of tenure holders without processing facilities (denoted here as 'nonindustrial').

Two further assumptions draw from original proposals of the Commission. The first is that the market would be the basis for the pricing of Crown stumpage which is harvested in tenures held by companies in the forest products industry, and which are presumed to contain the "non-market" wood. The second is that the Province, by whatever agency, would be a direct seller for at least a part of the "market" wood. As these various conditions would affect the development and implementation of a market, some resulting aspects of both supply and demand in the market should be noted.

The Supply Structure of the Harvest

As the form of the organization of the resource would have a bearing on the nature and efficiency of the market, a simplifying assumption has been adopted, derived from the Commission's recommendations. It is that 50 per cent of the annual allowable cut from Crown forests would be held by companies with processing facilities. The other 50 per cent would be divided between tenure holders without processing facilities, and a provincial forest agency.

As the tenure holders with processing facilities would be obliged on practical grounds to trade a part of their timber output in order to balance and improve their wood supply mix, these proportions do not need to be treated as exact. They do provide an analytical convenience, one which conforms broadly to the U.S., Swedish and Finnish categories of public, forest industry, and nonindustrial 'private' timberlands and timber and log supply. In terms of the supply structure in these other regions, one-quarter of the B.C. harvest would be controlled directly by the state, one-quarter by the nonindustrial tenure holders who (in supply terms) would be the equivalent of private forest owners', and one-half by the present licensees in the forest products industry.

The matter of how these proportions might be achieved in tenure restructuring, and how the remaining industry tenures might be strengthened and increased in value, is a subject for a separate paper. Aside from noting that the nature of the property rights in in both the industrial and nonindustrial tenures would have an important influence on the operation and effectiveness of the market (Pearse 1989), the further simplifying assumption is that title to the tree or log will pass to the market participant at the time stumpage is paid. The suggestion has been made, however, that the involvement of the Crown in the market, or its interest in market transactions, should cease at that point.

This approach may conflict with other recommendations of the Commission, including the specification that stumpage charges on timber harvested by industry tenure holders would be derived from prices in the market. On this matter of market-based stumpage pricing, a conflict may also arise between objectives of the Commission, specifically in the 'efficiency' of market outcomes from a diversity of supply sources. This matter will be revisited briefly in the concluding section of this chapter.

Concentration Ratios on the Demand Side

Any expectations notwithstanding, the initial participants in the market on the demand side would be those producing companies and their operations which exist now. Moreover, they will have the same price horizon for their final product output, the same comparative cost structure, and (it is a specific assumption) the same timber supply they do now.

Aside from changes or adjustments which would otherwise occur in the absence of a more competitive environment, the new factor which a market would introduce at the outset would be the ability of some firms to expand more readily (because the harvest would no longer be fully allocated among producers), and the inability of some other firms to compete. This one dynamic element, however, introduces the basis for other possible changes. One of these, raised by industry discussants, is especially germane to the discussion.

It will be recalled from the literature survey in the first chapter that the maintenance of competitive conditions (as in Mead et al. 1983), or the emergence of imperfections in the market (e.g., Johansson and Lofgren 1985, Binkley 1991), are areas of particular emphasis. Concentration ratios, relative degrees of market power, and the possibility of local or area monopsonies arising in a B.C. market are also concerns expressed by many industry members, especially those in the non-integrated and smaller groups.

The difference from the practices observed in the literature is that this market power would be applied not only to sellers (the usual case), but also to competing buyers. This type of possibility is considered in recent economic research, in which (Roberts 1987:175-6) the "deep pockets" financial capacity of a larger company induces "a predation to induce exit" from the industry on the part of smaller competitors, termed "prey". While such larger firms may be able to use market power against sellers to keep prices below the level of a competitive equilibrium, it is not to their advantage to drive the nonindustrial sellers out. Instead, in B.C., it is the non-integrated net buyers who report they are fearful of being squeezed.

These concerns are rational if there is an unduly high level of concentration in the market on the demand side to start with. For the U.S. Northwest, it will be recalled that in only a few of the 10 market "areas" delineated by Mead et al. (1983) did the leading four purchasers account for more than 50 per cent of timber sales, and in no cases for more than 60 per cent. Recent evidence (Adams and Haynes 1991) indicates that competition, if anything, has increased in the interim - a pattern reported as well for the U.S. South in the previous chapter.

In B.C., however, higher concentration ratios than those in the U.S. Northwest obtain. In this measure, the concentration ratio is the share of committed AAC in licenses held by the four leading companies in each of the six forest regions of the MoF . In all six regions, the four leading firms account for 60 per cent or more of committed AAC, and for 70 per cent in the three largest regions - the Vancouver, Prince George and Prince Rupert, with 76 per cent of total AAC. Given these ratios, a transitional policy of "set-aside" sales as provided by the USFS, as well as "position limits" for major participants in other types of markets (Siegal and Siegal 1990), will be proposed in the recommendations.

The Composition and Framework of the Market

The industry and regional composition of the participants in the market can now be set out. These express or evolve from the existing basis of the industry and resource. For this identification, reference may be made to the tables and charts in the appendix. The tables are drawn from a previous background study published by the Commission (Nawitka 1991). The charts are derived from this 1991 study and Statistics Canada.

In numerical order, the tables identify estimated fibre consumption at capacity by product usage, by forest region, with calculations of net fibre balances; the regional distribution of AAC by leading tenure holders; and the number and total annual capacity of mills or operations by final product category in each forest region. The charts depict the regional structure or location of the lumber and pulp and paper industries; the regional definition of a market; and the role of lumber as the central industry in a market.

In the market, there would be several categories of participants. The net buyers are those firms or industry segments identified in the tables and charts, the group which comprises the existing forest products industry, as well as any further elements which develop. The pure sellers into the market are the Crown (timber) and 'nonindustrial' tenure holders (timber and/or logs), as well as private forest owners and farm and ranch holders of agricultural leases containing timber. Traders are tenure holders with processing facilities, whether the trades involve logs-for-logs or logs-for-chips. Buyers (of timber) as well as sellers (of logs) are independent loggers operating on their own account. Timber and log brokers form the intermediary group.

The market is large, by volume about 80 per cent of that in Sweden and two-thirds that in the U.S. Northwest market, although proportionally less (at least initially) in value. The level of annual transaction value can be roughly approximated. In 1990, the shipments value of the B.C. logging industry which cuts the harvest was of the order of $4 billion. In addition, log exports amounted to a further $145 million (Price Waterhouse 1991). Half of this value is in excess of $2 billion a year. As trades would occur; a chip sales value of $810 million a year would be directly or indirectly affected; and a secondary market would be likely to emerge; the total value of transactions could be substantially higher.

The market would also be regionalized. While the Coastal market extends in economic delivered costs along the full length of the Mainland and Islands littoral, there may be local market areas which develop with greater volume, especially if timber sales and auctions are expanded. The Interior, however, would be segmented regionally. The effective boundaries between subregional markets in the Interior can be identified by industry members on the basis of resource distribution, present road networks, and hauling costs.

The regional landscape would be marked by two dominant forest administration units: the Vancouver forest region with 23.7 million m3 of committed harvest volume, and the Prince George with 18.1 million m3. These two regions contain 56 per cent of total cutting rights in the Crown commercial forest. Given the generally higher quality of their timber stocks, they also provided in excess of 66 per cent of total stumpage revenue from licenses in 1990.

The pattern in raw material consumption among industries in the forest sector which has obtained in recent years could be expected to hold in a larger market. This pattern has been included in the annual reports of the B.C. forest industry commissioned by COFI (Price Waterhouse 1987-91). The volume shares for the 1986-90 period are as follows.

Log Volume Consumption in the B.C. Forest Products Sector, by Major Utilization Category, 1986 to 1990

INDUSTRY SEGMENT	Volume of logs utilized (in millions of cubic metres)				
	1990	1989	1988	1987	1986
Sawmills	61.9	67.0	68.6	70.0	58.3
Plywood mills	4.2	4.5	4.3	4.8	3.9
Log Export	0.8	1.9	2.7	3.4	2.6
Pulp and other	11.7	14.2	11.5	12.7	13.2
TOTAL	78.6	87.6	87.1	90.9	78.0
% of Total:					
Lumber	78.8	76.5	78.8	77.0	74.7
Pulp and other	14.9	16.2	13.2	14.0	16.9

Source: Price Waterhouse, 1987-91.

As indicated in the table, lumber emerges as the central industry in fibre flows in the forest sector. Sawmills purchase an average 77 percent of the output of the logging industry, and provide in chip form 65 per cent of the fibre needs of the pulp and paper industry. This status would be maintained in a larger market, and is depicted in Chart 4 in the appendix.

These constituent elements for a market are comparable to those in other forest regions with large, active markets in which the forest products industry depends mainly on external raw material supply. The principal distinction in fibre consumption is the active market for pulpwood in Scandinavia and U.S. South. Given this consumption framework for a timber and log market, however, the precedents in these other regions may now be reexamined in more specific terms as to the operational and organizational features which might be adopted for B.C.

Buyers and Sellers in a Competitive Market

A market is made up of buyers and sellers, and intermediaries acting for either group or on their own account. Both buyers and sellers require certain assurances from a market in order that they may function and compete. These requirements have been incorporated as criteria in the theory of markets in order to ensure equity, efficiency and workable competition. These criteria are: (i) a sufficient number of participants in the market at any time; (ii) equal access to the market for each participant subject to any reasonable qualifying requirement; (iii) full information on prices, volumes and other pertinent data, both for specific transactions, and for the market as a whole; and (iv) continuity or sufficient frequency of trading, in order to satisfy buyers' supply needs and sellers' timing preferences.

Given the incorporation of these criteria in the operation of a market, the needs and preferences of buyers and sellers can be addressed by the adoption of sale or auction procedures, bidding and pricing methods, and other transaction techniques. For this assessment, additional material from the reviews can be applied. In the following discussion, the application of these techniques for buyers and sellers is taken in turn.

Bidders and Buyers in a Competitive Market

From recent research a good deal is now known about buying decisions and bidding strategies on the part of timber market purchasers (in Adams and Haynes 1989, 1991), as well as about subsequent decisions as to when to harvest after purchase (e.g., Rucker and Leffler 1988). The supply model proposed by the Commission obliges a degree of understanding of buyer motivation and behaviour.

Factors Encouraging Buyer Participation

From empirical timber market studies, the chief requirement for effective competition is an adequate number of bidders or buyers (generally four to six), whether for timber auctions, log market transactions, or negotiated supply contracts. This buying group must also be relatively free of collusive behaviour. Hence the preference in normal sales for sealed bids (generally first- or single-price), instead of English auctions with rising oral or signalled bids (Milgrom 1987 for the theory; Paarsch 1989a, 1989b, for application to B.C. timber sales). Moreover, the results from sealed bidding can be tested in monitoring systems based on sale data analysis (Haynes 1983) as well as further work directed to transaction evidence (Haynes, discussion).

Within this framework for adequate competition, there are conditions which discourage buyers, and others which encourage their participation. The key factor in enlisting buyer activity is the minimizing of uncertainties and inadequate information. For this reason, the importance of professional timber cruising, adequate sale descriptions, and regular price reporting was noted in the previous chapter.

Economic elements in bidding decisions include the buyer's assessment of current spot prices, the costs of holding timber after purchase, the expected appreciation (if any) of spot price at time of harvest, and the time options open for harvest in the sale contract (Adams and Haynes 1991:2-4). As a result, flexibility of options in sale size, contract duration and other terms encourages the level of buyer participation and - equally important - the relative dollar value of bids.

A matter on which there is some controversy is pricing terms. The two basic options in other regions are'lumpsum' pricing, and pricing at time-of-harvest. In lump sum sales, price is fixed by winning bid at time of sale, a deposit is taken, and the balance of payment of the original bid price is made at time of cut. In pricing at time-of-harvest, the high bid wins the sale, a deposit is taken , the balance of payment is made at harvest, but the price at harvest is either the price in the (then) spot market, or is based on a market index measure.

Except in short-term sales, time-of-harvest pricing tends to be preferred by buyers, as it provides more options for profit opportunity and risk-avoidance. For sellers, however, lump sum sales may be more advantageous and administratively less costly, and are now the prevalent practice in nonindustrial private timber sales in the U.S. South (Colberg, discussion). For public timber, lump sum pricing has been advocated in order to reduce uncertainty for the selling agency, and to discourage both 'inefficient production decisions' and 'speculation' (Muraoka and Watson 1986:74-6). In general, however, the time-preferences of buyers are likely to be sufficiently diverse (and vary at different points of time) that flexibility would be needed by both public and private timber sellers in sale sizes, contract durations, and payment terms.

Sale Practices of Public and Private Sellers

In the Commission's supply model there are both public and nonindustrial sellers, for timber or logs. The Crown would be a seller of standing timber on an open basis, for which the precedent of the U.S. Forest Service is available. The nonindustrial tenure holders could sell either timber or logs. Their closest counterparts as 'private' sellers are the nonindustrial private forest owners in Scandinavia and the U.S. For both types of seller, sources in the reviews provide a number of auction or transaction practices leading to sales success. These are briefly reviewed for public and 'private' nonindustrial timber in turn.

Public Timber Sales and Auctions in the Market

The elements of the National Forest supply process have been set out in a number of publications (e.g., Adams and Haynes 1989:403 ff. and 1991:7-10 for more detail). For timber sales, the process commences with budget decisions by Congress inasmuch as the resulting expenditure level pre-determines the volume and number of sales which can be placed on the market during a fiscal year. Once volume offered is known, the appraisal of each sale is undertaken to determine appraised price. The process used is the residual value method, but it is not without complication (Adams and Haynes 1991:9):

> Nearly all National Forest timber offerings in the West include two or more species of different value. In recognition that each offering is an undivided package, it is appraised as a whole, though appraised prices are developed for each species. Under Agency policy, advertised appraised prices for each species must exceed so-called base rates, generally defined as some minimum rate plus an allowance for costs of regeneration. The actual advertised rates where bidding begins are calculated as if permanent roads were in place. Road costs are estimated separately to determine the amount of purchaser credit the contract holder will receive as the road work is completed.

Successful sales are those which exceed appraised price, attract bidders and are, of course, sold. Sale quality characteristics include sale size, method of sale (sealed vs. oral bidding), and road construction costs. As lesser quality sales (lower appraised price, small size, high road costs) involve a greater risk of low profitability, "firms often may fail to submit bids on such sales under sealed bidding requirements".

This tendency towards fewer bids in lower quality sales involving sealed bids leads to a greater ratio of unsold sales. Conversely, a high ratio of sold sales is positively related to higher overbids, in which the use of sealed bids do not appear to be a deterrent to higher price. While further testing would be required, these outcomes suggest that a Crown forest agency might want to adopt a provisional strategy of oral bidding for lower quality or marginal timber, and sealed bids for the rest.

A further factor in public timber sales is contract length. The reason is that contract duration beyond the short-term provides sold but as yet uncut volume which buyers use both for forward supply and as a market hedge. In the USFS, average contract duration is now three years. In terms of this period (Adams and Haynes 1991:20), sales contracts are generally of sufficient length to allow postponement of harvest "until current prices rise enough to make harvest attractive. In the interim, buyers will harvest from existing low-price sales, buy and harvest new sales at currently low prices, or procure wood on the open market." Provision for different lengths of contract and a sufficient duration up to a three year term appears to increase sales success and average sale price.

On balance, the (as yet) uncut volume in timber sales act as a stabilizing influence as the impact of changing market conditions is "buffered" by the residual volumes carried over from one period to another. Moreover, an interplay is permitted and develops between public and other timber (Adams and Haynes 1991:45):

> Both the high elasticity and lagged shifts in National Forest supply over time account for the counterpoising changes observed in National Forest and private harvest shares in Western regions. During rising markets, the share of National Forest harvest tends to rise and the private share tends to fall. Shares change in the reverse direction in falling markets.

This finding relates to the volatility of demand for National Forest timber noted in the previous chapter. An examination of volume data indicates that while the private harvest rises moderately during stronger markets (and declines moderately thereafter), changes in the level of the public harvest are much greater, leading to a larger market share in these periods (and a smaller share during market declines), as observed by Adams and Haynes.

The marketing of public timber in a B.C. fibre market thus involves decisions as to what volumes to offer, and when; how much inventory (i.e. sold but uncut volume) in the market to plan for; and what combination of contract lengths to adopt. The USFS practices provide choice for buyers and the opportunity for higher returns for the seller. Moreover, to increase the ratio of sales success, a targeted utilization of oral as well as sealed bids may reduce the 'unsold' amount of marginal or lower-quality timber; while the general adoption of first-priced sealed bids is likely to increase average sales prices in medium- and higher-quality timber by impeding opportunities for collusive bidding.

As to sale size, it is likely that the Crown timber selling agency would have considerable flexibility in this regard. One-quarter of the annual Crown harvest sold at public auction would amount to close to 19 million m3, less than the average annual volume of 30 million m3 in the last decade by the USFS in the U.S. Northwest, but three times the level of small business sales in B.C. For the Crown as seller, the other important factor - especially to meet potential needs of buyers - is sale frequency, including during soft market periods.

To meet this need, the recommendations will include a policy of regular sales, reservation pricing at appraised cost, and the recycling of unsold sales to be brought back to the market at a later time. As for price reporting, published timber, log and final product market statistics similar to those collected by the USFS (Warren 1991) can be supplemented by transaction reports available to all interested bidders.

'Private' Timber and Logs in the Market

The practices reviewed above for public timber can be adopted for both the Coast and Interior regions, as is the case between the East Side and West Side zones in the U.S. Northwest. For the nonindustrial sellers of timber and logs, the distinction between Coast and Interior regions would be important.

In the Interior, economic distances between sellers and buyers create a number of geographic market zones. Within these zones, the maintenance of competition requires limitations on local monopsony power, for which certain restrictions will be proposed. In contrast, a single market area would remain on the Coast. In the coastal market, timber sales (when logged) are as mobile as logs themselves, and would be a complementary - and probably larger - component of the market, once forward contracts for one, two or three years are established.

Under the Commission's model of AAC distribution, the non-industrial group would represent not only the one-quarter of the Crown harvest assumed to be assigned to it, but also the nonindustrial part of the annual harvest which flows from private lands. On the specified assumption that the present AAC level in the Crown forest will remain in effect, this group represents an annual harvest potential of some 24 million m3, roughly divided into one-third on the Coast and two-thirds in the Interior. The market in the two regions is addressed briefly in turn.

On the Coast, there is an extant log market in the form of the VLM. It is the view of members of the COFI log market committee in discussions for this study that the market should be permitted to evolve. In the Commission's supply schema, however, two developments, would affect the market's status.

The first is that the industry groupings on the VLM may change, brought about by lower fibre control ratios for major licensees, additional supply in nonindustrial public and private hands, and more competition. The second would be a weakening of inter-company relationships as tenure holders have less volume to trade. Moreover, if 50 per cent of the Crown harvest on the Coast is placed for sale on the market, competition for logs must expand.

The joint production of timber and logs on the Coast also introduces different forms of contractual relationships. Nonindustrial owners in other regions sell stumpage on a negotiated basis to forest firms and market loggers; retain forestry consultants or agents to conduct timber sales; or have timber harvested for sale on the open market through log brokers or pulpwood dealers. On this basis, competition for timber sales would increase as well.

In the Interior, the situation might be quite different. The evolution of an informal, private market has led (according to its participants) to relationships among mills, small business loggers, private land owners, farmers and ranchers and holders, which have been allowed to take shape and mature. Further, even though regional concentration in tenures exists, a greater representation of producing firms operates throughout most of the Interior, and an adjustment to a 50 percent market reliance may be simpler.

Conclusions and Recommendations from the Study

The foregoing sections in this chapter complete the evidence for this study. From this basis, conclusions and recommendations may be advanced. These deal in turn with the organization of the market; timber and log market operations; and measures and techniques which appear to be those which can be most productively adopted. An outline of the process proposed for the development and implementation of the market follows the recommendations.

The Form of Market Organization: A Self-Regulated 'Franchise'

The organizational basis proposed for a timber and log market in B.C. is that of self-regulation and operation. This more organized and disciplined approach has been adopted in many industries, professions and exchanges. To ensure the maintenance of fair competitive practices and the public interest, oversight would be provided by a provincial regulatory agency. The self-regulated market would be responsible for all operations, develop (in tandem with the oversight agency) the market trading and conduct rules, and have disciplinary measures to deal with infractions or abuses.

Given the concentration ratios in the present allocation of AAC, and the starting fibre demand positions of integrated industry participants, the market organization could have no affiliation with any existing industry organization. This restriction applies particularly to COFI, the association of record in the Northern Interior as well as the Coast, and thus the industry agency related to three-quarters of the annual Crown harvest.

Sellers and buyers would be members of the organization, as would log and timber brokers and other intermediaries qualifying under the market rules. These members would be licensed, and non-members would be obliged to sell or buy through licensed broker members. As is the case with self-regulated market organizations (Siegal and Siegal 1990), formal licensing of members would be the responsibility of the oversight agency.

Separate market operations committees of the organization would be established for the Coast and Interior regions, coordinated by a joint central board. Representation on the board for membership categories (integrated, non-integrated, nonindustrial tenure holders, independent loggers, brokers, the Crown as a seller) would be provided by election by their voting members. There would be an annual report, an annual meeting, and at least one annual audit and review by the provincial oversight agency.

Given the role of the Crown as a direct seller into the market, and the Commission's proposal that stumpage charges on Crown timber be determined by prices in the market, any provincial Ministry or agency should disqualified from any involvement in the operation of the market. Moreover, as a seller, the Ministry of Forests cannot be the oversight agency the self-regulated form of organization will require.

The alternative proposed derives from a treatment of the market, the firm and the legal aspects of market organization by R.M. Coase of the University of Chicago, the recent Nobel Laureate in economics. In the analysis, the role and development of markets is traced. Granted or permitted successively by kings and governments, markets have been franchises. Where a public interest or other parties are involved, their role is now more elaborate (Coase 1988:10):

> It is evident that, for their operation, markets such as those that exist today require more than the provision of physical facilities in which buying and selling can take place. They also require the establishment of legal rules governing the rights and duties of those carrying out transactions in these facilities.

The alternative for market participants is "to depend on the legal system of the State". If the choices are posited in this way, considering that the Crown is unlikely to cede its ownership interest in the resource, the members of a market can determine where their interests may better lie. One method is a market organized by the industry on behalf of all participants in the market. The other is a market organized by, or operating under the laws or regulation of, the state.

The choice preferred from the evidence in this study is a model which comes as close as possible to private market organization with oversight regulation given the 94 per cent land ownership of the Crown. The market operates for the member participants, and can be substantially designed by them. At the same time, given the public franchise of the organization, the Crown and public can see what is transpiring in the market at any given time.

Timber and Log Market Operations:

The market organization would supervise the timber and log markets. In this process, it would provide a general but effective oversight to minimize any interference with private transactions in the open market. It would also have the authority (as in any self-regulated body) to enforce the applicable trading and conduct rules. The Coast and Interior log and timber market committees would be drawn from elected members of the board. These committees would also ensure the provision of coordinating functions to facilitate buyers, sellers and intermediaries in market transactions.

The market organization would provide notification of timber auctions and list timber and log sales. Other functions or services would include the approval of standard documents and contract forms to which all sellers and buyers (including the Crown as seller) would be bound. A central registry of buyer, seller and broker members would be developed, and be available to all member participants. Given the importance of good information for timber auctions and other sales, a registry of qualified timber cruisers and scalers certified by the market organization should also be maintained. In addition, the market body could provide or recommend qualified auctioneers to conduct timber sales for nonindustrial or industrial members.

The central market body would also maintain and provide regular price reporting of all transactions of timber and log sales in the market. While the buyers and sellers need not be publicly identified, the general location, sale size, species and grade composition would be included, along with the sale price. In timber and log market transactions, prices for each species would be identified. Transaction reporting by the market body is not intended to usurp opportunities for commercial market reporting services. It is, however, a standard requirement in self-regulated market 'franchises' of this type.

Market Methods and Measures: Rules and Options

It can be assumed that both nonindustrial and industrial tenure holders will be profit-maximizers seeking the highest return. The Crown can be a utility or a profit maximizer, depending on the policy mix of revenue and economic or social policy goals. Sellers other than the Crown can also be expected to test for profit-maximizing techniques that also permit a basis for minimizing risk, seeking a combination of (a) an assured level of basic cash flow, and (b) profit opportunities above the base level sought. For their part, industrial buyers would want to guarantee a portion of their non-tenure supply from the Crown selling agency and nonindustrial sellers, resorting to the spot market for trades and incremental supply.

This basis, along with the practices facilitating buyers and sellers outlined earlier, sets up a need for flexible measures and options in timber and log transactions. At an early stage of market design, rules for both spot and forward markets would need to be developed. If the evidence from the various reviews in the study were to be adopted, these measures would include:

Bidding:	Both oral and sealed (depending on grade).
Sale size:	Various volumes and lengths for different buyer groups.
Sale duration:	Nonindustrial sellers can contract up to 50% of their AAC in negotiated supply contracts of up to three years, if three or more non-affiliated bidders or buyers compete. If fewer

than three bidders, the maximum sale length is one year. The Crown would sell in one, two and three year durations.

Sale Frequency:	At the discretion of the seller in nonindustrial tenures. Regular and frequent selling by the Crown timber selling agency, but no sales below full-cost appraised price.
Sale pricing:	Lump sum pricing for smaller or short-term sales. Could be a combination of base price and time-of-harvest pricing in negotiated supply contracts and larger auction sales.

To ensure a basis for workable competition, certain restrictions would be required. To prevent tenure holders from 'contracting' their former volume, nonindustrial tenure holders should be allowed to negotiate supply contracts which total not more than 50 per cent of their AAC, or 50 per cent of their total sales, whichever is the lesser. The balance of the harvest would be offered in individual timber or log sales. To prevent hoarding by these tenure holders, the full AAC should be marketed over a specified period - for which three years might suffice. While single bids which exceed appraised price in competitively offered sales should be accepted, the Crown selling agency should not be permitted to negotiate supply contracts at all.

As for buyers, "position limits" which are instituted in many self-regulated markets are recommended. Such a limit would be applied to both Crown and nonindustrial sales. An example would be a maximum ceiling on any one buyer of 25 to 35 per cent of the sales volume offered by any one seller. This restriction is necessary to check the development of local market control by major buyers, and to ensure raw material in competitive bidding or buying for smaller producers.

The Crown Selling Agency: Revenue and Responsibility

All Crown sales would have to meet or exceed the 'appraised' price. The basis for this appraisal would be developed by the Crown selling agency, and submitted to both the provincial oversight agency and the market organization for approval. As noted, timber would have to be offered on a continuous basis in the market, and 'unsold' sales would be withdrawn to be recycled later. If lump sum pricing is required on contracts of one year or less, index measures for time-of-harvest pricing in the second and third years of a timber auction contract would be required, and maintained by the market body.

In Crown auctions, 'full cost' pricing would include a road allowance in the appraised price and full provision for regeneration and silviculture - for which the Crown selling agency would be responsible. Sealed bids should be adopted for all but lower quality timber. Auctions or sales would be advertised through the market organization. On completion of the sale, the Crown agency would report the price and all other required information to the market's price-reporting service.

For a transitional period, the USFS practice of reserving a portion of total volume as "set aside" sales for smaller or independent producers might be adopted. While agency revenue per unit of volume has been found to be lower than in open auctions, this approach would assist in meeting industry and community needs. Set aside sales reserved for independent loggers would be phased out, inasmuch as logging firms would be able to bid at any Crown or nonindustrial timber sale, as well as (assuming requisite qualifications) for the non-industrial tenures themselves.

On the Crown as revenue earner, there is one Commission proposal requiring, in the view of this study, substantial caution. This is the recommendation that all stumpage charges on Crown timber in tenures be derived from prices in the market. Two problems arise in this proposal. First, volatility in raw material prices in both high and low final product market periods will be exaggerated by the market, in contrast to a pattern of greater stability found in other regions examined. Second, the opportunity is denied to both buying and selling participants to 'play' the market at any given time.

In other regions, forest industry firms switch between public timber, nonindustrial timber and their own timber, depending on which is cheaper or dearer at the time. In the Commission's approach, these potential gains in operating and strategic efficiency would not be available since "market" and "non-market" timber and log prices would move as one.

The Implementation Process to a Market

If a market structure, operating basis and set of transaction procedures can be recommended, there remains the process of development and implementation. The introduction of a large timber and log market in the province would be an act of public policy. As such would require Ministerial coordination and direction. Yet, if the objective is a basis by which a self-regulated private market and public timber can coexist, then the participation of the existing industry and all other membership groups in the intended market would be required. Seven steps are proposed in the market formation process.

The first, from which much else flows, is the choice and designation of the Crown agency to oversee and review the self-regulated market organization. As indicated, this agency cannot be the MoF, and should be separate from the Ministry altogether.

The second, which is perhaps a simpler matter, is to designate the Crown selling agency which would need ample time to prepare its role, and to develop and submit its market procedures to the oversight agency. This selling body can be a unit of the MoF, or a separate forest agency reporting to the Minister.

The third, which would be a simultaneous step, is to ask the broadly representative group of associations formed by the various industries in the forest products sector to compose a working group. The task of this group is to draft the market organization, operations, procedures, and trading and conduct rules. If this working group cannot be formed voluntarily, the Minister of Forests should appoint it, after broad consultation within the sector. The Crown selling agency be represented on this working group. As the nonindustrial tenure holders will not be in place at this stage, the Minister would appoint representatives to ensure their interests are upheld.

Fourth, the draft market organization is discussed, negotiated, approved by the various participant groups, reviewed and accepted by the Minister, and formed. An initial board is elected by the representative member groups, and licensing of members by the oversight agency proceeds.

Fifth, the nonindustrial tenures are awarded, the membership of the successful bidders in the market organization is confirmed, and representatives of this membership group are elected to the market organization board.

Sixth, the log and timber market committees for the Coast and Interior regions are nominated, and the services and functions of the market body are developed.

Seventh, the market is open for business, and the sales and trading flows into it begin.

Once it is initiated, this process should be accomplished in one full year. A secure basis for market participants suggests that enabling legislation would be required. The tenure changes contemplated by the Commission, and which create the group of nonindustrial tenure holders, would need the longest time to effect.

The essential elements in the process are Ministerial policy direction and negotiation, and the close involvement of industry participants who would become market members from the outset. This implementation process, and the prior set of recommendations leading up to it, do not constitute a plan. They form a proposal, for which constructive improvements should be invited and sought.

Appendix

Tables and Charts

Table 1
Estimated Fibre Consumption and Net Balances, by Product Usage and by Forest Region, 1989

SECTOR USAGE	FOREST REGION Vancouver	Pr. Rupert	Pr. George	Cariboo	Kamloops	Nelson	TOTAL
Lumber	23530	7763	18882	6898	8621	6319	72013
Plywood	982	0	921	522	1270	404	4099
Shakes/Shingles	2692	0	0	0	21	211	2924
Wood Products Industries	27204	7763	19803	7420	9912	6934	79036
Pulp	18800	4557	7410	2359	2386	1996	37508
Chips	*(9403)*	*(3027)*	*(7566)*	*(2894)*	*(3879)*	*(2668)*	*(29437)*
Paper and Allied (net)	9397	1530	*(156)*	*(535)*	*(1493)*	*(672)*	8071
Committed AAC Volume (000 m3)	23674	9240	18137	8939	7758	6572	74320
Wood Products Industries	27204	7763	19803	7420	9912	6934	79036
Paper and Allied (net)	9397	1530	*(156)*	*(535)*	*(1493)*	*(672)*	8071
Net Regional Balance (+ or -)	*(12927)*	*(53)*	*(1510)*	2054	*(661)*	310	*(12787)*

Table 2
Regional Distribution of AAC in Licenses, by Leading Corporate Tenure Holders Ranked by Volume Size

COAST

Firm Name and Region	Volume (000 m3)	% AAC in Lic's
Vancouver: AAC	*21901*	*100.0*
MacMillan Bloedel (3)	6911	31.6
Fletcher-Challenge (2)	3991	18.2
Doman/WFP (2)	2759	12.6
CP Forest Products (1	1825	8.3
Leading 4 Firms	*15486*	*70.7*
Interfor	1621	7.4
Canfor (1)	1469	6.7
Weldwood	1238	5.7
Terminal	308	1.4
Leading 8 Firms	*20122*	*91.9*
Prince Rupert: AAC	*7513*	*100.0*
West Fraser/Enso (1)	2317	30.8
Repap (1)	1190	15.8
Noranda (1 - *PG*)	1123	14.9
Westar	717	9.6
Leading 4 Firms	*5347*	*71.1*

INTERIOR

Firm Name and Region	Volume (000 m3)	% AAC in Lic's
Prince George: AAC	*14304*	*100.0*
Canfor (2)	3462	24.2
Fletcher-Challenge (1)	2723	19.0
Noranda (1)	2623	18.3
Lakeland	1409	9.9
Leading 4 Firms	*10217*	*71.4*
Slocan	993	6.9
West Fraser (1 - *Car*)	704	4.9
Westar	652	4.6
Louisiana Pacific	452	3.2
Leading 8 Firms	*12124*	*84.8*
Cariboo: AAC	*6751*	*100.0*
Weldwood (1)	1631	24.2
West Fraser (1)	1187	17.6
Fletcher-Challenge	681	10.0
Jacobson Bros.	593	8.8
Leading 4 Firms	*4092*	*60.6*

Firm Name	Volume (000 m3)	% AAC in Lic's
Kamloops: AAC	*6601*	*100.0*
Weyerhauser (1)	1623	24.6
Tolko	1154	17.5
Fletcher-Challenge	1080	16.4
Ainsworth	557	8.4
Leading 4 Firms	*4414*	*66.9*
Nelson: AAC	*5391*	*100.0*
Crestbrook (1)	1399	26.0
Westar	924	17.1
Pope & Talbot	710	13.2
Slocan	661	12.3
Leading 4 Firms	*3694*	*68.5*

Source:

Table 3
Potential Forest Industry Participants in a B.C. Fibre Market, by Product Category, Production Capacity in 1990, and Forest Region

FIBRE CONSUMPTION AT CAPACITY BY INDUSTRY CATEGORY

FOREST/ MARKET REGION	(1) Annual Output Measure	(2) Number of Mills or Operations	(3) Annual Production Capacity (see Col. 1)	(4) Annual Fibre Use Capacity (M m3)	(5) Annual Chip Output Capacity (M m3 RWE)
VANCOUVER					
Lumber	MMfbm	60	4589	23530	9197
Plywood	MM sq.ft.	9	583	982	226
Poles	M pieces	8	211		158
Pulp	M m.t.	10	4197	18800	
Shakes/ shingles	M sq'rs	55	4873	2692	- - -
TOTALS			142	46162	9403
PRINCE RUPERT (Coast)					
Lumber	MMfbm	5	739	3065	1195
Poles	M pieces	3		90	68
Pulp	M m.t.	2	859	4557	
TOTALS		10		7690	1195
A. TOTAL COAST		152		53852	10598
PRINCE RUPERT (Interior)					
Lumber	MMfbm	7	1046	4698	1883
Poles	M pieces	2		76	- - -
TOTALS		9		4755	1883
PRINCE GEORGE					
Lumber	MMfbm	33	4441	18882	7320
Plywood	MM sq.ft.	4	921	982	226
Poles	M pieces	1	10	8	
Pulp	M m.t.	6	1519	7410	- - -
TOTALS		44		27221	7566
		- -		- - -	- - -
B. TOTAL NORTHERN INTERIOR		53		31976	9399

Table 3 (Con't)

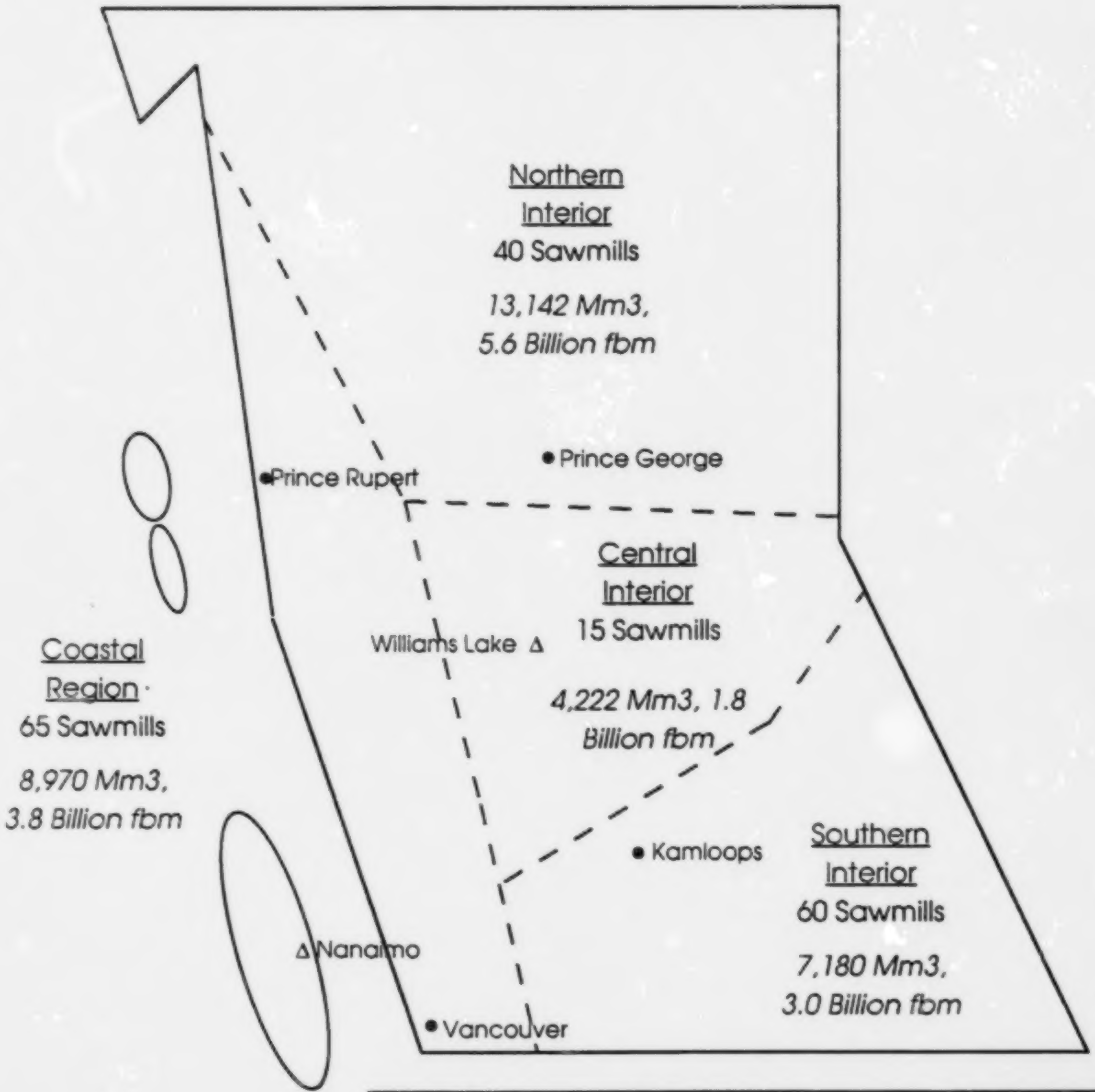
FIBRE CONSUMPTION AT CAPACITY BY INDUSTRY CATEGORY

FOREST/ MARKET REGION	(1) Annual Output Measure	(2) Number of Mills or Operations	(3) Annual Production Capacity (see Col. 1)	(4) Annual Fibre Use Capacity (M m3)	(5) Annual Chip Output Capacity (M m3 RWE)
CARIBOO					
Lumber	MMfbm	15	1644	6898	2690
Plywood	MM sq.ft.	2	336	522	204
Pulp	M m.t.	2	4197	2359	- - -
TOTALS		19		9779	2894
KAMLOOPS					
Lumber	MMfbm	30	1978	8621	3448
Plywood	MM sq.ft.	7	708	1270	431
Poles	M pieces	6	218	164	
Pulp	M m.t.	1	426	2386	
Shakes/ shingles	M sq'rs	1	38	21	___
TOTALS		45		12462	3879
NELSON					
Lumber	MMfbm	30	1450	6319	2528
Plywood	MM sq.ft.	3	228	404	140
Poles	M pieces	6	312	234	
Pulp	M m.t.		2	364	1996
Shakes/ shingles	M sq'rs	3	382	211	- - -
TOTALS		44		9164	2668
C. TOTAL SOUTH-CENTRAL		108		31405	9441
		- - -		- - -	- - -
TOTAL PROVINCE		313		117,233	29,438

Source: Nawitka Resource Consultants, 1991

Chart 1

B.C. Lumber Production and Regional Volume, in Thousands of Cubic Meters(m3) and Billions of Board Feet

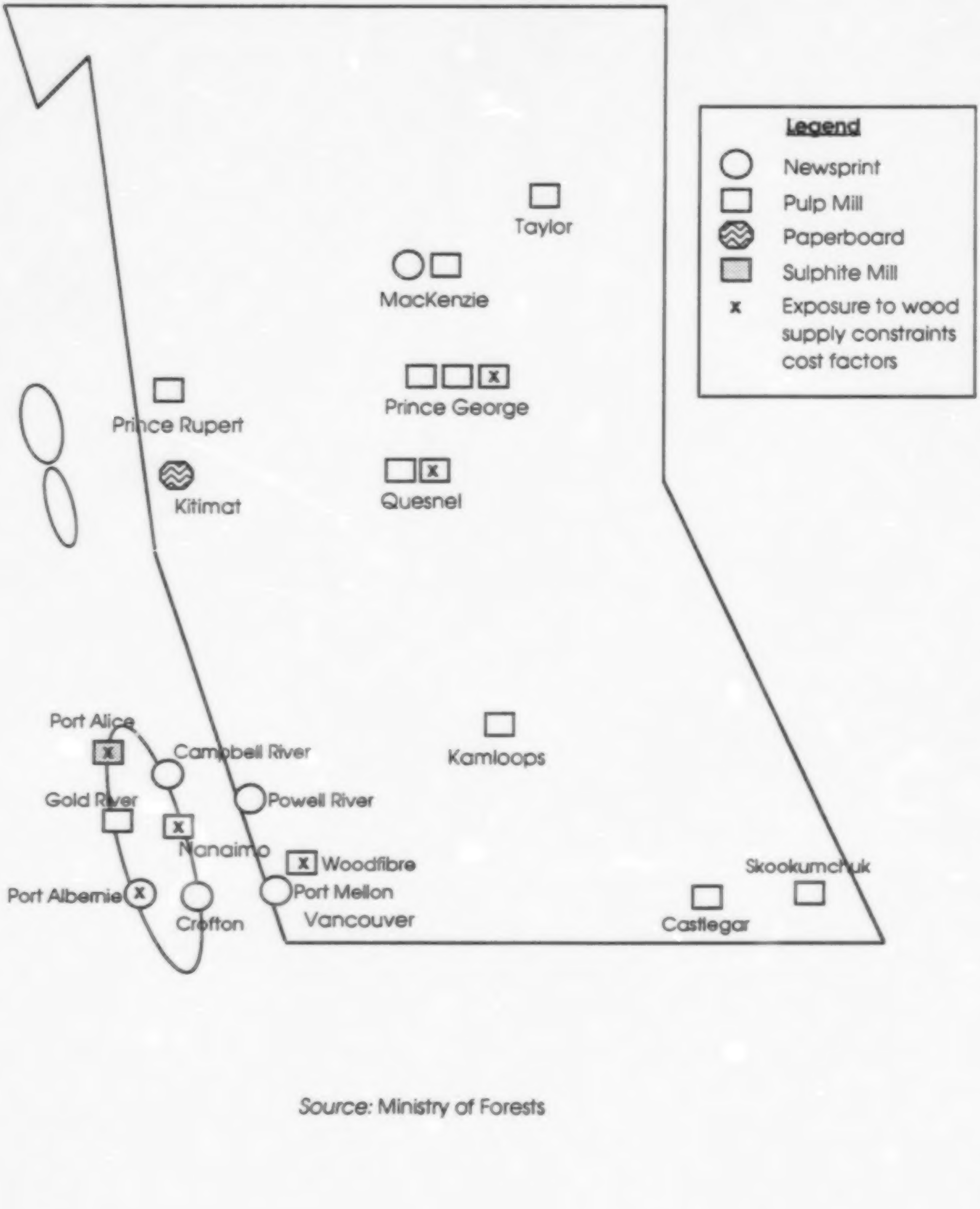

Northern Interior
40 Sawmills
13,142 Mm3,
5.6 Billion fbm
Prince George
Prince Rupert
Central Interior
15 Sawmills
Williams Lake
4,222 Mm3, 1.8 Billion fbm
Coastal Region
65 Sawmills
8,970 Mm3,
3.8 Billion fbm
Kamloops
Southern Interior
60 Sawmills
7,180 Mm3,
3.0 Billion fbm
Nanaimo
Vancouver

Regional	Production Shares	Avg. Mill Production
Coastal Region	26.8%	58.5 MM fbm
Northern Interior	39.4%	140.0 MM fbm
Central Interior	12.7%	120.0 MM fbm
Southern Interior	21.1%	50.0 MM fbm
Total B.C.	*33,514 Mm3 = 14.2 Billion fbm*	*180 Mills*

Sources: Statistics Canada, for Production
Nawitka Resource Consulants, for number of mills

Chart 2

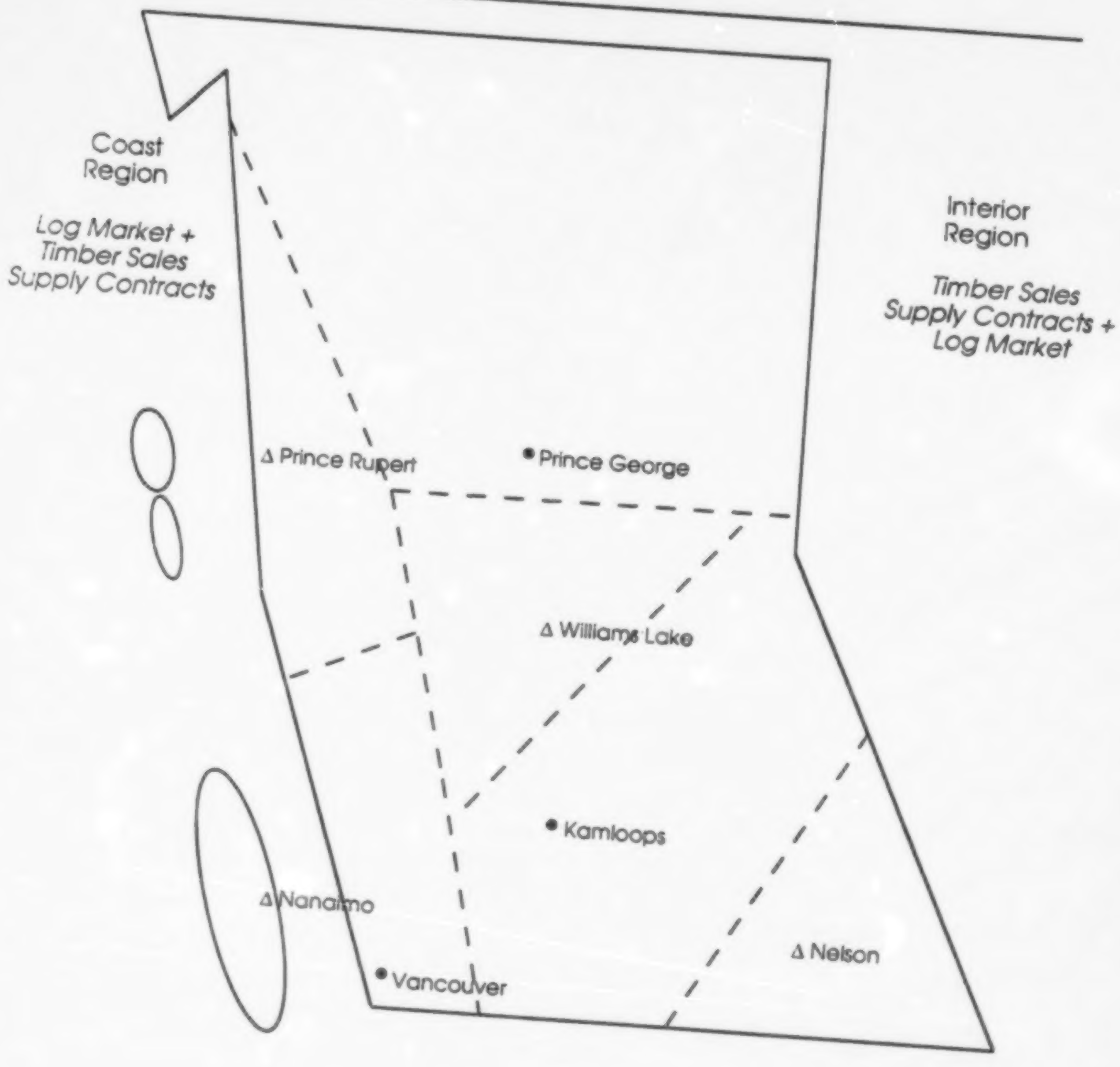
Principal Pulp and Paper Facilities in British Columbia


Legend
Newsprint
Pulp Mill
Paperboard
Sulphite Mill
Exposure to wood supply constraints cost factors
Taylor
MacKenzie
Prince George
Prince Rupert
Kitimat
Quesnel
Port Alice
Campbell River
Kamloops
Gold River
Powell River
Nanaimo
Woodfibre
Port Alberni
Port Mellon
Crofton
Vancouver
Skookumchuk
Castlegar

Source: Ministry of Forests

Chart 3

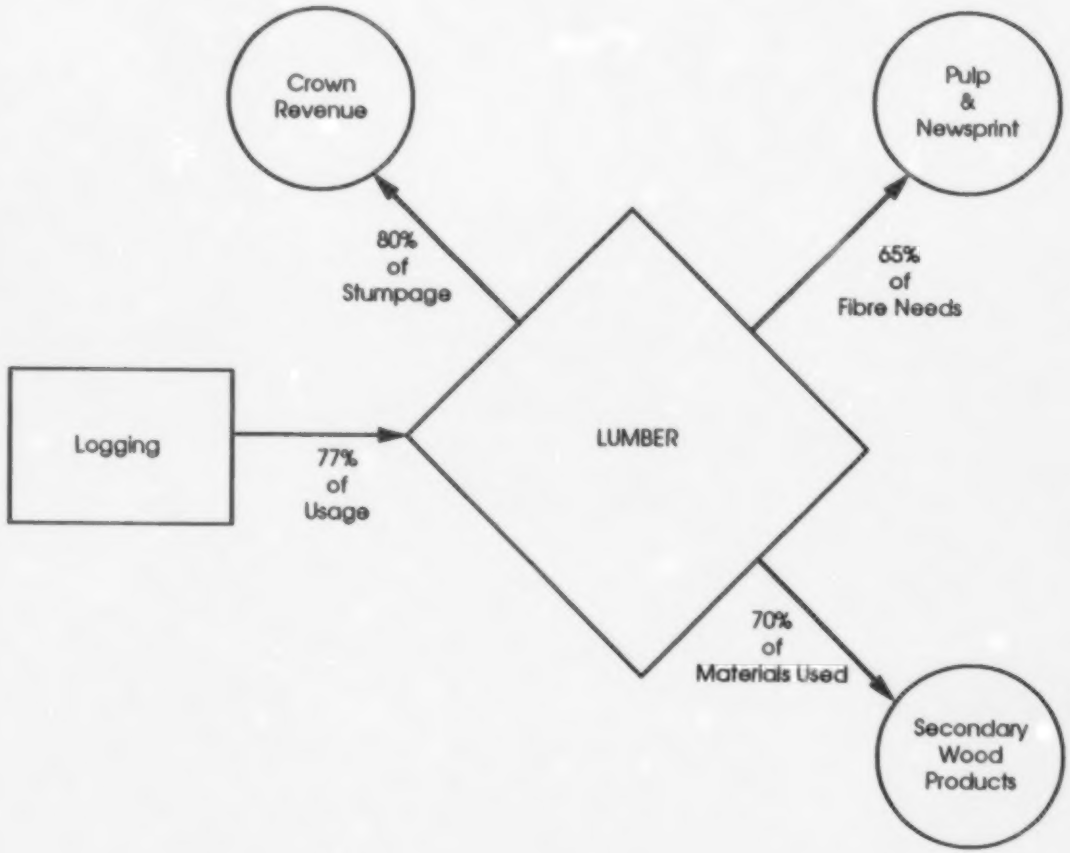
Principal and Regional Centres in a B.C. Fibre Market


Coast
Region
Log Market +
Timber Sales
Supply Contracts
Interior
Region
Timber Sales
Supply Contracts +
Log Market
Δ Prince Rupert
• Prince George
Δ Williams Lake
• Kamloops
Δ Nanaimo
• Vancouver
Δ Nelson

• Principal Fibre Centres Δ Regional Fibre Centres

Chart 4

The Role of Lumber as the Central Industry in the Forest Products Sector


Crown Revenue
Pulp & Newsprint
80% of Stumpage
65% of Fibre Needs
Logging
77% of Usage
LUMBER
70% of Materials Used
Secondary Wood Products

Sources: Data from Ministry of Forests, Price Waterhouse and Statistics Canada

BIBLIOGRAPHY

Adams, Darius. 1983. An Approach to Estimating Demand for National Forest Timber. Forest Science 29 (2): 289-300.

Adams, Darius M., Clark S. Binkley and Peter A. Cardellichio. 1991. Is the Level of National Forest Harvest Sensitive to Price? Land Economics 67 (1): 74-84.

Adams, Darius M. and Richard W. Haynes. 1980. The 1980 Softwood Timber Assessment Market Model: Structure, Projections and Policy Simulations. Forest Science 26 (3), Monograph 22.

Adams, Darius M. and Richard W. Haynes. 1989. The Future of the Douglas-fir Region Forest Economy: Potential Development under Changing Public Policies and Private Resources. Seattle: University of Washington, CINTRAFOR Working Paper 26.

Adams, Darius M. and Richard W. Haynes. 1989. A Model of National Forest Timber Supply and Stumpage Markets in the Western United States. Forest Science 35 (2): 401-424.

Adams, Darius M. and Richard W. Haynes. 1991. National Forest Timber Supply and Stumpage Markets in the Western United States. Portland: USDA, Forest Service.

Alig, Ralph J. and David Wear. 1992. Changes in Private Timberland: Statistics and Projections for 1952 to 2040. Journal of Forestry, May 1992: 31-36.

Andersson, A.E. and Runar Brannlund. 1988. The Demand for Forest Sector Products, Ch. 10 in Markku Kallio, Dennis P. Dykstra and Clark S. Binkley, eds., The Global Forest Sector: An Analytical Perspective. Chichester: John Wiley.

Binkley, Clark S. 1991. Imperfections in Timber Markets: Theory and Practice. Vancouver: University of B.C., Faculty of Forestry.

Binkley, Clark S. 1988. Economic Models of Timber Supply, Ch. 5 in Markku Kallio, Dennis P. Dykstra and Clark S. Binkley, eds., the Global Forest Sector: An Analytical Perspective. Chichester: John Wiley.

Binkley, Clark S. and Jeffrey R. Vincent. 1988. Timber Prices in the U.S. South: Past Trends and Outlook for the Future. Southern Journal of Applied Forestry 12 (1): 15-18.

Brannlund, Runar, Per-Olov Johansson and Karl Gustaf Lofgren. 1985. An Econometric Analysis of Aggregate Sawtimber and Pulpwood Supply in Sweden. Forest Science 31 (3): 595-606.

Brazee, Richard and Robert Mendelsohn. 1988. Timber Harvesting with Fluctuating Prices. Forest Science 34 (2): 359-372.

Buongiorno, Joseph, Sun Il Bark and Lance Brannman. 1985. Volume Offered and Wood Prices: A Causality Test for National Forests. Forest Science 31 (2): 405-413.

Cardellichio, Peter A. and Darius M. Adams. 1990. An Appraisal of the IIASA Model of the Global Forest Sector: Advances, Shortcomings and Implications for Future Research. Forest Science 36 (2): 343-357.

Cardellichio, Peter A., Y.C. Youn, C.S. Binkley, J.R. Vincent and D.M. Adams. 1988. An Economic Analysis of Short-Run Timber Supply around the Globe. Seattle: University of Washington, CINTRAFOR Working Paper 18.

Cardellichio, Peter A., Yeo Chang Youn, Darius M. Adams, Rin Woo Joo and John T. Chmelik. 1989. A Preliminary Analysis of Timber and Timber Products Production, Consumption, Trade and Prices in the Pacific Rim until 2000. Seattle: University of Washington, CINTRAFOR Working Paper 22.

Coase, R.H. 1988. The Firm, the Market and the Law. Chicago: University of Chicago Press.

Connaughton, Kent P. and Richard W. Haynes. 1983. An Evaluation of Three Simplified Approaches to Modelling the Regional Demand for National Forest Stumpage. Forest Science 29 (1): 3-12.

Colberg, Ralph E. 1992. An Industry Approach to Timber Supply Projections. Mobile: SOFEW Conference. Also forthcoming in American Papermaker, July 1992.

Council of Forest Industries of B.C. 1989. The Vancouver Log Market: Report to the Select Standing Committee on Forests and Lands. Vancouver: COFI.

Council of Forest Industries of B.C. 1990. Response to the Select Standing Committee on Forests and Lands, First Report. Vancouver: COFI.

Council of Forest Industries of B.C. 1991. Vancouver Log Market - Volume Sold and Produced by Species. Vancouver: COFI.

Demsetz, Harold. 1989. Efficiency, Competition and Policy: Vol. 2, the Organization of Economic Activity. Cambridge, Mass.: Basil Blackwell.

Diamond, Peter. 1987. Equilibrium without an Auctioneer, in Truman F. Bewley, ed., Advances in Economic Theory: Fifth World Congress. Cambridge: Cambridge University Press.

Dykstra, Dennis P. and Markku Kallio. 1989. The IIASA Base Case Projections, in Peter A. Cardellichio, Darius M. Adams and Richard W. Haynes, Forest Sector and Trade Models: Theory and Applications. Seattle: University of Washington, CINTRAFOR Proceedings of an International Symposium.

Flora, Donald P., Andrea L. Anderson and Wendy J. McGinnis. 1991. Pacific Rim Log Trade: Determinants and Trends. Portland: USDA, Forest Service.

Flora, Donald F. and Wendy J. McGinnis. 1989. Alaska Mid-Grade Logs: Supply and Offshore Demand. Seattle: University of Washington, CINTRAFOR Working Paper 14.

Flora, Donald F. and Wendy J. McGinnis. 1991. An Analysis of the Effects of Northern Spotted Owl Conservation, Harvest Replanning, a Log Embargo, and Recession on the Northwest Log and Lumber Trade. Western Journal of Applied Forestry 6 (4): 87-90.

Forest Resources Commission. 1991. The Future of Our Forests. Victoria, B.C.

Gregory, G. Robinson. 1987. Resource Economics for Foresters. New York: John Wiley.

Haynes, Richard W. 1979. An Evaluation of Two Measures of Competition for National Forest Timber Sales. Portland: USDA, Forest Service.

Haynes, Richard W. 1980. Competition for National Forest Timber in the Northern, Pacific Southwest and Pacific Northwest Regions. Portland: USDA, Forest Service.

Haynes, Richard W. Sealed Bidding and Activity of Outside Bidders for National Forest Timber. Journal of Forestry 78 (6): 344-346.

Haynes, Richard W., Coordinator. 1990. An Analysis of the Timber Situation in the United States: 1989-2040. Fort Collins, Colorado: USDA, Forest Service.

Haynes, Richard W. 1991. Monthly Stumpage Prices for the Pacific Northwest. Portland: USDA, Forest Service.

Haynes, Richard W. and Darius M. Adams. 1985. Simulations of the Effects of Alternative Assumptions on Demand-Supply Determinants of the Timber Situation in the United States. Portland: USDA, Forest Service.

Haynes, Richard W. and Roger D. Fight. 1992. Price Projections for Selected Grades of Douglas Fir, Coast Hem-Fir, Inland Hem-Fir and Ponderosa Pine Lumber. Portland: USDA, Forest Service.

Haynes, Richard W. and Debra D. Warren. 1989. Volume and Average Prices of Stumpage Harvested from the National Forests of the Pacific Northwest, 1974 to 1987. Portland: USDA, Forest Service.

Howard, Andrew F. 1990. Log Grades and Lumber Yields for Lodgepole Pine at an Interior Board Mill. Vancouver: University of B.C., FEPA Working Paper 145.

Huang, F. Mey and Joseph Buongiorno. 1986. Market Value of Timber when Some Offerings are not Sold: Implications for Appraisal and Demand Analysis. Forest Science 32 (4): 845-852.

Jackson, David H. 1980. The Microeconomics of the Timber Industry. Boulder, Colorado: Westview Press.

Jackson, David H. 1987. Why Stumpage Prices Differ between Ownerships: A Statistical Examination of State and Federal Timber Sales in Montana. Forest Ecology and Management 18: 219-236.

Johansson, Per-Olov and Karl Gustaf Lofgren. 1985. The Economics of Forestry and Natural Resources. London: Basil Blackwell.

Johnson, Ronald. 1979. Oral Auction versus Sealed Bids: An Empirical Investigation. Natural Resources Journal 19 (2): 315-352.

Kuuluvainen, Jari. 1986. An Econometric Analysis of the Sawlog Market in Finland. Journal of World Forest Management 2 (1): 1-19.

Lippke, Bruce and John Perez-Garcia. 1992. The Economic Impact of a Log Export Tax: Who Gains and Who Loses. Seattle: University of Washington, CINTRAFOR Special Paper Series.

McAfee, Roger P. and John McMillan. 1987. Auctions and Bidding. Journal of Economic Literature 25: 699-738.

Mead, Walter J., Mark Schiepp and Richard B. Watson. 1983. Competitive Bidding for U.S. Forest Service Timber in the Pacific Northwest, 1963-83. Santa Barbara: University of California.

Milgrom, Paul R. 1987. Auction Theory, in Thomas F. Bewley, ed., Advances in Economic Theory: Fifth World Congress. Cambridge: Cambridge University Press.

Muraoka, Dennis D. and Richard B. Watson. 1986. Improving the Efficiency of Federal Timber Sale Procedures: An Update. Natural Resources Journal 26 (1): 69-76.

Nawitka Resource Consultants. 1991. Data on the Corporate Concentration of Harvesting Rights, Manufacturing Capacity and Ownership in the B.C. Forest Industry. In Forest Resources Commission, Background Papers - Volume 5, Victoria, B.C.

Newman, David H. 1987. An Econometric Analysis of the Southern Softwood Stumpage Market: 1950-1980. Forest Science 33 (4): 932-945.

Newman, David H., and David N. Wear. 1990. Research Directions in the Study of Timber Markets and Forest Policies. Asheville, North Carolina: USDA, Forest Service.

Paarsch, Harry J. January 1989. An Empirical Examination of British Columbia Timber Sales. Vancouver: University of B.C., FEPA Working Paper 118.

Paarsch, Harry J. July 1989. Structural Econometric Models of British Columbia Timber Sales. Vancouver: University of B.C., FEPA Working Paper 133.

Pearse, Peter H.. 1976. Timber Rights and Forest Policy. Report of the Royal Commission on Forest Resources. Victoria, B.C.

Pearse, Peter H. 1988. Property Rights in the Development of Natural Resources in Canada. Vancouver: University of B.C., FEPA Working Paper 105.

Pearse, Peter H. 1990. An Introduction to Forestry Economics. Vancouver: University of B.C. Press.

Perez-Garcia, John. 1991. An Assessment of the Impact of Recent Environmental and Trade Restrictions on Timber Harvest and Exports. Seattle: University of Washington, CINTRAFOR Working Paper 33.

Perez-Garcia, John and Bruce Lippke. 1991. The Future Supply of Timber from Public Lands: Recent Sales will not Support Competitive Processing. Seattle: University of Washington, CINTRAFOR Working Paper 32.

Roberts, John. 1987. Battles for Market Share: Incomplete Information, Aggressive Strategic Pricing, and Competitive Dynamics, in Truman F. Bewley, ed., Advances in Economic Theory: Fifth World Congress. Cambridge: Cambridge University Press.

Rucker, R.R., and K.B. Leffler. 1988. To Harvest or not to Harvest? An Analysis of Cutting Behaviour on Federal Timber Sale Contracts. Review of Economics and Statistics 70 (2): 207-213..

Samuelson, Paul. 1976. Economics of Forestry in an Evolving Society. Economic Inquiry 14 (4): 466-492. Reprinted in Hiroaki Nagatani and Kate Crowley, eds., The Collected Scientific Papers of Paul A. Samuelson, Vol. IV, Cambridge: MIT Press, 1979

Select Standing Committee on Forests and Lands. June 1990. First Report: Forest Act - Part 12 and the Vancouver Log Market. Victoria: Legislative Assembly of British Columbia.

Task Force on Crown Timber Disposal. July 1974. Timber Appraisal: Policies and Procedures for Evaluating Crown Timber in British Columbia. Victoria, B.C.

Uhler, Russell S. July 1991. Why Not Log Markets? FEPA Newletter 7 (1):2-3.

Uhler, Russell S. December 1991. Further Discussion of: Why Not Log Markets? Vancouver: University of B.C., discussion draft.

U.S. Department of Agriculture, Forest Service. 1988. The South's Fourth Forest: Alternatives for the Future. Washington, D.C.: USDA, Forest Service.

Waggoner, Thomas R. 1989. International Trade in Forest and Related Products, in Paul V. Elletson, ed., Forest Resource Economics and Policy Research. Boulder, Colorado: Westview Press.

Warren, Debra D. February 1992. Production, Prices, Employment, and Trade in Northwest Forest Industries, Third Quarter 1991. Portland: USDA, Forest Service.

Washburn, Courtland L. and Clark S. Binkley. 1990. Informational Efficiency of Markets for Stumpage. American Journal of Agricultural Economics, May 1990: 394-405.

Wear, David N. 1992. Softwood Production and Investment in the U.S. South: History and Projections. Research Triangle Park, North Carolina: Southeastern Center for Forest Economics Research, forthcoming.

Wear, David N. and David H. Newman. 1991. The Structure of Forest Production: Short-Run and Long-Run Results. Forest Science 37 (2): 540-551.

Comments on Timber and Log Markets" by John de Wolfe

Clark S. Binkley
2 July 1992

This report makes a useful start in describing how a timber/log market might work in British Columbia. To form a blueprint for action, the report should deal more directly with the transition from the current situation to the proposed log market, and with the problems of how the structure of the market will be maintained over time. Some elements of the proposed market will have pernicious effects that will undercut the very gains in economic efficiency that is the overriding objective for establishing a timber/log market in the first place. Redesign of the market could overcome many of these problems, but markets in the interior will probably have a small number of participants no matter how they are structured. Establishing a timber/log market has clear consequences for other aspects of forest policy such as forest practice legislation, tenure arrangements and attracting capital to both forest management and the processing sector. As a consequence, some attention must be paid to the linkages between the timber/log markets and these other policy considerations.

Comments on each of the three chapters in the report follow.

Chapter 1 Timber and Log Markets in the Literature

This chapter discusses some of the relevant literature, but does not review it in either a critical or analytical way. Quite a lot of the review focuses on econometric models of the forest sector. The discussion accepts uncritically the methods and findings of this literature. However, while this literature is interesting, it is not very relevant to the problem of designing timber markets for BC.

The report discusses two relevant parts of the literature. One of these relates to imperfect competition, and de Wolfe has appropriately summarizes the relevant research in this area. The second relates to the theory of auctions and bidding, and de Wolfe only touches on the relevant material. This is surprising because some of the best empirical studies of auctions actually use data from timber sales. There have been several studies of this type (and de Wolfe does review some of Mead's work), but other relevant articles include:

Brannman, L., J.D. Klein, and L.W. Wiess. 1987. The price effects of increased competition in auction markets. **Review of Economics and Statistics** 92: 24-32.

Hansen, R.G. 1986. Sealed bid versus open auctions: the evidence. **Economic Inquiry** 24: 125-141.

Haynes, R.W. 1979. A comparison of open and set-aside timber sales on national forests in the Douglas-fir region. **Land Economics** 55: 278-284.

Johnson, R. 1979. Auction markets, bid preparation costs and entrance fees. **Land Economics** 55: 313-318.

__________. 1979. Oral Auctions versus sealed bids: an empirical investigation. **Natural Resources Journal** 19: 315-335.

Rucker, R.R. 1984. An economic analysis of bidding and cutting behavior on public timber sales contracts. U. Washington Dept. of Economics Ph.D. dissertation, Seattle, WA.

I suggest that the literature review we revised to (i) eliminate the material on econometric models of the forest sector which is largely irrelevant to the topic at hand, and (ii) be expanded to include a more thorough analysis of the literature cited above and other studies that focus directly on the operation of timber markets.

In addition, the citation for the quotation on the top of page 14 ("Our findings suggest that...") is incorrect. The correct citation is

Adams, D.M., Clark S. Binkley and Peter A. Cardellichio. 1991. Is the level of national forest timber harvest sensitive to price? **Land Economics** 67: 74-84.

The cited quotation occurs on page 82 of this article.

Chapter 2. Timber and Log Markets in BC and the US

In general this chapter does a very good job of describing timber markets in these two regions. I am particularly pleased to see the recognition that log markets do exist in BC, both on the coast and in the interior. I am also pleased to see some recognition of the forestry problems associated with nonindustrial private holdings in the US South (the literature on this subject also notes many of the same problems in Sweden, Finland and Germany).

However, given that we have log markets (if only rudimentary ones) in BC, it would be logical to examine them very carefully, and try to understand in detail how they work and how they could be adapted to achieve the objectives outlined by the Commission. Although there is some discussion of these markets, the report does go far enough in this direction.

Timber markets in the US are increasingly affected indirectly by forest practice regulations that require harvesting permits before any logging is done. Such regulations both affect timber markets indirectly, and provide some of the administrative framework that would be needed to implement a timber/log market in BC. The report does not discuss this form of regulation, or how it might apply to BC. Given the current interest here in forest practice legislation, it would be logical to examine how such regulation would interact with proposals for log or timber markets.

A new form of nonindustrial ownership increasingly plays a role in timber markets in the US. Pension funds and similar pools of capital contract with management companies and now hold perhaps $2 billion of timberland in the South the Pacific Northwest. Such arrangements have many attractive features for BC (these firms have adequate financial strength to manage land effectively, they have a long-term outlook, and because of their ownership they have a social conscience). Although the report mentions these ownerships in passing, it would logically discuss their special needs in more detail.

The report (p. 27-29) seems to suggest that the lower volatility of timber prices in the U.S. South is due to a greater diversity of ownerships in that regions. I believe that the evidence supports another interpretation. In the first place, for most forest products the South is the low-cost North American producer. As a consequence, the West (and BC as well) suffers more of the variation in final product demand. This greater variation in final product demand translates into greater variation in timber demand and timber prices, *even if supply conditions were identical among the regions*. In addition, timber supply elasticity is greater in the South than in other regions, so a given change in timber demand results in a smaller price change (and a larger quantity change) in the South than in the West.

This analysis has some important implications for the design of markets in BC. Specifically, one would expect more price volatility in BC that one currently observes in the South, even if supply sources are diversified as suggested in the report. In addition, if AAC rules are imposed on all tenure holders (as the report seems to suggest) then the timber supply elasticity in BC will be low, and price volatility will be still higher.

The information on timber market structures in the US provides some fairly reliable inferences about other short-run effects of moving to more extensive timber markets in BC. In a competitive market, timber demand is derived from product demand, and timber prices reflect the residual value of the wood after other production costs and quasi-rents have been accounted. For the last two years in BC, firms have posted large financial losses. As a consequence, total stumpage payments probably would have been lower under a market system than under the current system. In addition, some of the high cost and low quality wood that firms were forced to utilize would probably have been left unharvested.

Finally, the timber sales procedure used by the US Forest Service have been severely but thoughtfully criticized. In particular, some have called for an elimination of the appraisal system as a costly anachronism unneeded if markets are properly structured. Some have also criticized some of the other rules (the short duration of the sales, the prohibition of transfers of sales, the efforts to eliminate "speculators"). The report does not reflect the strength of thoughtful criticism that has been levied against the US Forest Service sales system.

Chapter III. Implementing a Wood Fibre Market

This chapter makes a good start on describing how a wood-fibre market might be implemented in BC. Some points that derive from the bidding literature bear emphasis, and some questions remain.

I personally have not gone pack to review the bidding literature cited above, but recall several conclusions that are pertinent to structuring timber markets in BC:

- Keep the average size of an individual sale fairly small,
- Keep the number of bidders as high as possible (perhaps by decreasing the size and increasing the sale duration),
- Keep the movement of timber into and out of the "store" of timber under contract as frictionless as possible. This means no restrictions on resales to third parties, no "use it or lose it" policies, and a long duration for

contract performance. The recent move by the US Forest Service to shorten sales from five to three years is retrogressive.

- Lump sum sales are preferable to scaled sales (lump sum sales reduce the cost of administration if wasteful and unnecessary appraisals are not done, and provide the right incentive to utilize low-quality wood).

- Do not exclude from the market "speculators" who own neither logging equipment nor mills.

- Eliminate all barriers to entry or exit from the market. In the case of BC, this means removing political interference in either closing or opening processing facilities regardless of their ties to individual tenures.

The proposed market structure is not consistent with all of these conclusions.

The report is also silent on several points that are relevant to the creation of a timber market.

- How would we move to 50% open-market wood? Who loses tenure and how are they compensated? How do we hold at 50% over time? Suppose a firm closes a mill, do they also lose tenure? If so, how does this relate to the free entry/exit that is needed for an efficient market? If a logger sees a business opportunity to start a mill, do they lose any tenure they might have had?

- How do we deal with the inevitable problems of poor management of small nonindustrial holdings? Does the reform of tenure also include forest practice legislation to guarantee a reasonable level of management of these lands? Will the nonindustrial tenures be large enough and adequately attractive to attract the long-term capital pools represented by pension funds?

- On the coast, the cost of water transportation is low compared to the value of a log so spatial market imperfections are not likely to be significant. In the interior (or anywhere that land transportation is important) spatial market imperfections will limit the number of effective bidders for an individual tract or set of logs. The report (page 41) suggests that four to six bidders is adequate, but the literature on auctions seems to suggest that even the presence of six bidders is inadequate to guarantee that bid prices are within 10% of the "true" market value. In many locations in the interior, the number of bidders is apt to be smaller than six.

- Why appraise the timber to set an upset price? If the market works, then the bid price is the value of the wood. If an appraisal is done, the cost should be kept as low as possible. The "transactions-evidence" approach used by the US Forest Service in the East would appear to be better than the residual-value approach used by the US Forest Service in the Pacific Northwest.

- Indexing the timber price, as suggested by the report, simply shifts the price risk from the buyer to the seller. One would expect mean bids to rise as a consequence, but it is not clear that the welfare of the province as a whole would be higher. The usual argument for governments to accept risk is that by pooling the risk of many small activities, they reduce the total risk through diversification. For this strategy to work, the risk of the smaller activities (in this case, timber sales) must be poorly uncorrelated statistically. However, because most of the sales would be destined for the same markets, one would expect a high degree of correlation among their prices, and little opportunity to diversify risk by pooling. In addition, if the crown timber is sold with indexing, then private timber sellers will operate at a disadvantage because they lack the financial strength to index. They will always be the residual supply. In short, it is not obvious to me that shifting the risk of price fluctuations from the buyer to the crown increases social welfare.

- The report seems to suggest that all tenures would operate under AAC restrictions. As indicated above, this will increase price volatility and will diminish the allocative efficiency (both among mills and through time) of the proposed timber/log market. It will also make the tenures very unattractive to such potential sources of capital as pension funds. On the other hand, without some reasonable quantity guarantees, investments in processing capacity are likely to be restricted. Perhaps a middle ground would be for the crown to sell, on an even flow basis, timber into an inventory of uncut volume under contract with relatively long period of performance for the contracts (e.g. five years with low-cost renewal for another three years), and to remove AAC restrictions from the other tenures. This would lead to reasonable long-term supply security without the worst economic effects of rigid harvest schedules.

Comments on the Report:

Timber and Log Markets by John de Wolf

Prepared for the Forest Resources Commission

by G.K. Bowden, Clayton Resources Ltd.

July 2, 1992

Forest Resources Commission

Review of Report, Timber & Log Markets, by John de Wolf[1]

OVERVIEW

This is a vastly improved document as compared to the first draft which was reviewed earlier this year. The irrelevant material has been shed, it is much more focussed, and seems to adhere reasonably well to the instructions (terms of reference) to the consultant.

Chapter 1 - Timber and Log Markets in the Literature

Overall, this is a fairly decent chapter, which could be significantly improved with some good editing.

In my view this Chapter would benefit from a short introductory exposition of the function of markets, to place the literature review in the important context in which it belongs. It would be preferable to have something other than the usual "invisible hand" discussion of Adam Smith. The following points about markets should be made:

Hayek said that free markets, in which information flows between producers and consumers, offer society the most efficient means of harnessing economic knowledge.

Producers, who have commodities for sale, can be assured of receiving the highest price, and "full value", when the commodities are exposed in an open market to those who can effectively utilize them. Discussions of the virtues of markets often focus on their role in ensuring efficient use of resources. In the case of timber, for example, it is argued that competition ensures that it goes to the processor who will add the greatest net value to it, and hence can afford to pay the highest price. If we don't have competitive markets, we can't be sure that we are making the wisest use of our resources, etc. etc.

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[1] note: the draft of the report as received for review does not have a title page, and the description of the report is taken from the June 25, 1992 letter from the Forest Resources Commission which accompanied the draft report.

In the case of timber, I think we often overlook the importance of prices as signals to timber producers. Yes it is important that producers of timber get full value for their resource, and when the producer is the Crown there is a particular public interest in that. But the other important aspect of getting prices "right" tends to be overlooked. That is the importance of the price signals in guiding decisions about investing in timber production, and for public forests, for planning integrated forest management. This kind of information is woefully lacking in British Columbia at present.

At the top of p 5 the de Wolf report cites Newman and Wear (1990), saying that the timber stumpage market is the interface between timber growers and wood product industries. This point warrants more emphasis in my view - that is a critical interface, and getting "correct" price information from it is very important. Binkley also notes the importance of price in his paper, which is cited by de Wolf on p. 15. To paraphrase Binkley - the wrong prices provide the wrong signals to market participants, too little timber is supplied, some land is managed with too little care, etc., "no important facet of the forest sector escapes the pernicious effects of imperfect timber markets."

So, markets are important for all facets of the forest sector. And it is important that markets work effectively.

Under the current tenure system in British Columbia the interface between producers (primarily the Crown) and consumers of timber isn't working very well. Those who hold tenures to Crown timber are primarily loyal to and interested in maximizing the return on their assets - processing facilities. They don't have incentives to maximize the returns to the forest land, because it isn't their land and their tenures to the product of the land are insecure.

In my view an important merit of the Forest Resources Commission's proposals which would create an open market for timber is the separation of ownership of land and processing facilities, creating a form of ownership where the loyalty of the entrepreneur would be to the forest land. For that kind of entrepreneurship to function most effectively, and provide the best service to society and the best use of its forest lands, it requires good information on the value of timber!!!

So that is the context in which I would like to see the literature review set. Explain why it is important to have an effective market functioning at the interface between timber producers and timber consumers - to repeat Binkley, that interface is critical to all "important facets of the forest sector".

That would provide a departure point for the ensuing review of research studies. Although it is not stated, the departure point for all of those studies is an understanding of the importance of the market process to efficient forest management. The studies represent a range of inquiries into different aspects of markets, how well they work, and what is required to ensure that they "deliver" in keeping with their potential.

Lacking a brief introductory "set up" of this type, to establish the relevance of the literature review, the reader can quickly lose track of what it is all about, and may regard it as irrelevant and "academic". Note, for example, that at the top of page 2 the report states that:

> Markets for timber and logs exist in a number of important forest regions. They have been studied extensively.

The report would be well served if there was some explication of how important those markets are, and why they are studied extensively, before it begins to review the details of some of those studies.

I think that the discussion under the heading **The Role and Structure of Timber Market Models** (pp 4-6) could be shortened significantly. I believe it follows the paper by Newman and Wear, and thus covers a good deal of ground that isn't relevant to the task the Forest Resources Commission is interested in - which is how to make a market for timber and logs work in B.C. For instance, there is little point in discussing how models can be used to predict prices for extended periods of time (bottom of p. 4). The Forest Resources Commission isn't interested in predicting prices - it is interested in making prices in a market. Similarly I question why the report would discuss (bottom of p 5) that models can be used to estimate "supply, demand or inventory elasticities", or the "Proposed research directions which can be specifically addressed by the utilization of timber market models.." (top of p. 6). I don't think the Forest Resources Commisssion wants to know about what kind of research can be done - it wants to know about what research has been done that will tell it how to make a market work.

This irrelevant material is harmless in the sense that there is nothing wrong with it, but it is damaging to the report in another sense. That is that it is a burden to read, and its presence obscures the material that is relevant to the Forest Commission's interests.

In introducing the reports reviewed under the heading **Economic Studies in Regional Timber Markets** (p 6) the report notes that the studies have been selected on the basis of "the relevance of the work for consideration of a comparable market in B.C...." Good, that is exactly why the report should select research from the literature for review. The following 9 pages (to p 16) are then taken up with a review of various studies. I will comment on that below. The point I want to make here is that the summation, under the heading **Extensions and Suggestions from the Review**, on page 16, says practically nothing about "the relevance of the work for consideration of a comparable market in B.C." It should; there should be a discussion which says "If you want a market to work effectively in B.C., this review of studies into timber and log markets elsewhere establishes that the following elements are important ...." Instead, the summation is given over largely to discussing developments and evolution in theory and the directions in which current research are going. The emphasis should not be on what the academics are doing, but on what they have done that can be used in making a real market work.

As to what is important in the studies reviewed, my comments are:

Mead, pp7/8 - sales characteristics (size, length, payment terms, nature of bidding) influence bidder participation and price. This is important and very useful if you are going to start selling timber competitively. Incidentally, if one was to canvass those who are responsible for selling timber for the DNR in Washington State (as I did last year) they report that their current experience bears out Mead's findings, and they have some useful advice on how to structure sales.

Haynes and Adams, pp8/10 - this study doesn't say a lot about how to make a market work. Some of the discussion about the relationship between harvest levels and timber prices is interesting, but one has to assume those who are producing timber have that kind of knowledge and it guides their decisions about how much to bring to the market at any given time. What we should be looking for in this study is how to make good markets, and that really wasn't the focus of this study.

Scandinavian Research, pp10/12 - it seems to me what is relevant here is that it points to some of the difficulties that are encountered in establishing competitive markets for timber - raw logs have a low value to weight ratio, and transportation costs tend to limit the number of potential bidders for any given stand of timber. The reports discuss how sellers attempt to balance the market power of buyers, and this could have been drawn out a little more in the review. Potentially very useful information if one is going to try to make a market for timber and logs work in B.C.

U.S. South Stumpage Markets, pp12/13 - Newman characterizes the regional market as perhaps the most competitive in the country, if not the world. If that is so, then his work should be examined to see how that comes about, because I think it is a given that we want to establish competitive stumpage markets in B.C. within the overall concept of the Forest Resources Commission. Unfortunately the review that is offered here doesn't deal with how the market is structured, but rather more with price elasiticities, etc. - interesting but not directly relevant to the job of creating a working market in B.C.

Adams and Haynes, pp13/14 - I see the relevant parts of this paper being those which focus on how to structure timber sales effectively - volumes to be offered, bidding process, upset price, etc. As the report notes on p 14, ".... a number of characteristics of competitive timber markets emerge..." I would have like to see those characteristics clearly identified.

Binkley, pp14/16 - the problems Binkley identifies are similar to those in the Scandinavian work already dealt with. Binkley suggests a number of remedies to correct the market imperfections. The report doesn't say what they are, rather says they will be brought forward in the third chapter (p 16). It would be preferable to have them clearly stated here, as I think they are lost in Chapter 3.

Chapter 2, Timber and Log Markets in B.C. and the U.S.

I don't like the way this chapter opens, saying we will now enter the realm of actual markets. The research in Chapter 1 deals with actual markets, and there is much that can be learned from it. The opening sentence here suggests that Chapter 1 is irrelevant.

As I turn to this Chapter what I am hoping to find is a review of the four markets which draws out their strengths and weaknesses and indicates "..elements which might be incorporated in a competitive fibre market in B.C." (p 17)

Existing Markets in B.C., pp18/24 - this material was in the first draft of the report, and provides a rather lengthy description of the Vancouver Log Market (VLM) and the informal markets in the interior. At the end, p. 24, it is stated that the interior market may provide a better model than the VLM model. It may, but what I find lacking in the description is an assessment of the shortcomings of the VLM. It has been argued repeatedly that it is not a real market, but one which exists primarily to facilitate trades among the major companies. What does the report have to say about this? Is that the reason the interior market is felt to be a better model, and are there other shortcomings in these markets? I think this is important; if we are going to try to create a truly effective timber and log market in the province, the weaknesses in the markets that now exist should be noted here, where the existing markets are introduced and described, so that the next chapter can build clearly on that foundation.

U.S. South, pp24/28 - Again a long description. Note that the forest industry in the south is substantial, see p. 24 - more lumber than produced in B.C., and three times the number of pulp and paper mills (and even more capacity) than B.C. I would have been more satisfied at the end of the description if the report had addressed the question of what elements in the forest products industry result in it being characterized as "...the most competitive in the country, if not the world.." (see Newman above, pp 12/13).

In other words, if we have a very large and presumably very successful industry, highly competitive, what makes it so? How do we explain the development of this industry in a relatively short time span? How important has the stumpage market, as the interface between timber growers and wood product industries, been in the development of this industry? (very important)[2]

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[2] If one reviews Sedjo's assessment of the condition of American forests the market interface appears to be very important. Sedjo finds the American forests in very good condition:

> by most criteria our forests are generally in excellent condition.

This assessment is applied to forests that have provided the raw material input to an ever-growing forest products industry. How is it that the demands of consumers been met without depletion of the forest estate? In large part because the market has provided signals which have encouraged investment in forests:

> the private sector, in an environment of

What elements are there in the market in the U.S. South that we should try to incorporate in a market interface in B.C.?

I think the report would be greatly improved if it tried to draw these elements out at this point, rather than just assuming that they will be recalled when formulating recommendations in Chapter 3.

Pacific Northwest, pp28/33 - Another largely descriptive section. My comments are parallel to those above dealing with the U.S. South. Is this market working? - ie. do we have a healthy industry and a healthy forest? If so, what are the key elements? Which elements should we try to emulate in a timber and log market in B.C.?

I find the summary for this chapter, **Market Approaches from the Regional Models**, which appears on p. 34, to be lacking - for the reasons I have noted above. The material that has been reviewed dealing with the United States is rich in information which demonstrates that an open, competitive, market is entirely compatible with a strong and healthy industry and a healthy forest. Some would argue that is a much better situation than we have in B.C. currently. If so, what are the elements in those

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> higher real prices for delivered wood, has taken the lead in generating the improvement of the nation's forests via management and widespread tree planting.

If the market has been that successful in the United States, particularly in the south, I would certainly like to see an attempt to isolate the factors which have made it so successful.

Sedjo, R., "Forest Resources: Resilient and Serviceable", Chapter 3 in Frederick and Sedjo, eds., America's Renewable Resources, Historical Trends and Current Challenges, Resources for the Future, 1991.

markets that explain their apparent success?

This chapter should wrap up with that kind of a discussion before turning in Chapter 3 to recommendations for a timber and log market in B.C. If it turns out that for institutional reasons (forest ownership) we can't simply move to create similar markets in B.C., we at least will have had a cataloguing of the features we should try to emulate as closely as possible. That is missing at present, and doesn't emerge clearly in Chapter 3.

Chapter 3. Implementing A Wood Fibre Market

My frustration with the failure of the report to draw out the important findings in Chapters 1 and 2 is crystallized by two passages in the opening pages of Chapter 3.

On page 35 the third paragraph concludes "From empirical evidence and testing with econometric timber market models, the articles and monographs summarized in the literature survey suggest how markets function in a competitive paradigm, and the market practices or conditions which can impede the process or arriving at competitive solutions." But, what are the processes through which markets function effectively, what conditions need to be met to ensure they work effectively? These points weren't drawn out in Chapters 1 and 2. I am now insulted as a reader by being told its in the literature, and I can just go and sort it out for myself.

Similarly on page 37 in the fourth paragraph there are various statements about market imperfections, techniques and measures to foster competition and inhibit non-competitive behaviour. I happen to know that is in some of the articles, because I have read them. But the review in Chapters 2 and 3 doesn't draw it out or summarize it. I get extremely frustrated when the report just tells me certain things are in the literature survey and the review of markets, but it hasn't been able to highlight them over the preceding 30 plus pages.

There should be a short statement of principles at the outset of this chapter. It should say, "Here is what we have found, from the reviews in Chapters 1 and 2, are the key elements in successful markets for timber and logs: A, B, C, D, E, etc.........[3] Now we are going to tell you in this Chapter how to adapt those elements to the particular circumstances in B.C. to create an effective market for timber and logs."

I think the material is in this chapter to achieve that goal quite effectively. If it began with a listing of A,B,C,D,E, etc, as I have suggested, my guess is that the elements could be broken down into supply side and demand side elements. The supply side in B.C. at the moment is horribly concentrated, the demand side not surprisingly is very highly concentrated, and not surprisingly, the markets which bring suppliers and demanders together aren't very well developed.

I would structure the recommendations around those 3 elements - supply, demand, market venue.

Supply

On the supply side the Forest Resources Commission has made recommendations which would break down the concentration, and the consultant is to assume about 50% of the annual harvest will be available to an open market. Given that, the report should then note how the suppliers of market timber and logs can most effectively "package" what they have to offer so as to realize the highest return for it in the market. There is much of value in the experience in the U.S. South and Northwest, and the Scandinavian countries - size of sale, duration, nature of bidding, etc. This can be found in Chapters 1 and 2, but needs to be drawn out, as I have noted.

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[3] This occurs in very general terms on page 41 under the heading **Buyers and Sellers in a Competitive Market**. But the criteria are generalized in the extreme. What we need to be told are how these criteria are met in markets for timber and logs. Surely that is why we have had the review which constitutes the first 2 chapters of this report.

There are also elements in Chapter 3, pp 41/45, where the factors which encourage buyer participation and practices of public and private sellers are reviewed. This could be much more focussed around the question - what are the most effective ways to offer timber and logs for sale? I see the following answers in the report:

- type of bids (p 41)
- adequate information/timber description (p 42)
- flexibility in sale size, duration, terms (p 42)
- pricing terms (p 42)

Those who would be selling timber and logs from the various tenures recommended by the Forest Resources Commission, would be greatly assisted by this. But I don't think they can be compelled to adopt any particular practice. After all if there is to be an effective market, one of the key elements will be to let entrepreneurs follow their own business judgments.[4]

Demand

The report points out that there is a problem here, at least initially, in terms of the very high levels of regional concentration (pp 38/39). It also suggests a transitional policy of set asides to deal with that problem (p 39, and again p 48) and some further measures (top of p 48). So, the key element should be open access, some degree of control over industry structure at least for an initial period, and after that let the chips fall where they may. (That is certainly what the reviews in Chapters 1 and 2 would drive one to conclude).

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[4] I don't think this report should let itself get bogged down in the matter of cut control and what volume to offer for sale each year. The markets seem to work that out quite well in other areas; and it could be assumed that the 50% of the timber that is in RMAs with processing facilities will have adequate cut control to ensure stability in the industry.

Market Venue

This should be the main focus of the report. What form of market venue is required to provide the necessary conditions for an effective market? This is particularly important as we want to move rather quickly from an "administered" market to a "real" market in a relatively short period of time (no, this isn't Russia).

The reasons that a new market venue are necessary, and the consultant is not content just to let the VLM and the markets in the interior evolve, should be clearly stated. What I find on this point at present is (p 45) "To ensure the maintenance of fair competitive practices and the public interest, oversight would be provided by a provincial regulatory agency. The self-regulated market would be responsible for all operations, develop .... the market trading and conduct rules...."

What this suggests to me is a structure similar to a stock exchange. The stock exchange sets the trading rules, the provincial Securities Commission is the oversight agency. Where this seems to differ, and what needs clarification, is that "...all non-members would be obliged to sell or buy through licensed broker members." (p 45, 3rd para under heading The Form of Market Organization: A Self-Regulated Franchise).

That seems to be a bit of a departure, and I'm not sure what it means. To look to other models, if a stock exchange works well, buyers and sellers will use it because it is the most efficient market in which to buy or sell. But buyers or sellers don't have to use it. There can be private sales, and the private sellers and buyers will probably use the prices established on the stock exchange as the basis for their trades.

Similarly with livestock sales (as per the first draft of this report). The livestock co-op makes a market (and tries to make an orderly market, as does the stock exchange), and as a seller I will probably use it if I believe it is the most efficient way to sell my stock. But I don't have to use it; there is nothing to stop me from selling directly to a purchaser, and basing the sale price on the prices established in the co-op markets.

Is it suggested in this report that all timber and logs must be sold through the market which is established? I think this needs to be clarified, and the case made if that is what is intended. See also p. 46, after the heading Timber and Log Market Operations, where it says the market organization would supervise and "...provide a general but effective oversight to minimize any interference with private transactions in the open market." versus the sentence at the bottom of p. 46, "..standard documents and contract forms to which all sellers and buyers (including the Crown as seller) would be bound."

What this seems to be saying is that all timber and or logs from Crown tenures that is sold (ie not used in the tenure holders own processing plant) must be sold through the market. If that is what is intended, then the report should state it exaclty that clearly. I should add that if that is what is intended, I don't have any difficulty with it. It is simply a condition of getting access to Crown timber; it ensures an open market, accessible to anybody who has the money to buy; and it ensures open information on the value of timber or logs. To go back to my opening comments on this Chapter, it is because the existing markets (particularly the VLM) don't do these things that a new market venue is required.

Since it is intended that the self-regulated market would develop the market trading rules (in tandem with the oversight agency) (p 45), then I don't think the likely rules suggested by the consultant (p 47) are necessary. After all, we have already been told earlier in the report that these are important elements in successful sales, I am prepared to assume that those who are members in the self-regulated market will be cognizant of them and act accordingly.

Finally, I'm not sure that the report needs to instruct the Crown on how to sell its timber (p 48).

My concluding comments on Chapter 3 are that it needs to be severely edited and organized so that it speaks clearly and directly to what it is recommending. The material that simply repeats descriptions from Chapters 1 and 2 should be deleted. It should state what it is trying to accomplish, why it is felt that a new market venue is necessary to achieve those goals, what form that venue should take, and who will be enlisted to "make it work". It should clarify if all Crown timber must be sold through the market, and if so why.

References

There are many citations in the report. I found most, but not all, of them known to me. I assume that a final draft of the report will include a complete bibliography.

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July 3, 1992

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Dear Sandy:

Re: MARKETS AND MANAGEMENT (Second Review Draft)

With only two working days to review this paper, my second commentary necessarily is pithier than the first. Please read it in conjunction with my earlier comments. Little of substance has been changed, none for the better.

Yours Sincerely,

A.N. Brett-Davies, R.P.F.

ANBD:abw

Encl.

Additional Comments on the CCG Consulting Report

(Second Review Draft)

'MARKETS AND MANAGEMENT'

1.0 INTRODUCTION

The second review draft is, mercifully, shorter than the first. However, this comparative brevity has been achieved simply by taking as "given" several of the false assumptions that the first draft tried, vainly, to support.

Our earlier concerns have not been addressed in any meaningful way. Therefore, our May 15, 1992 critique still stands as do the recommendations appended to it. Following are some additional comments, again made only in a coastal regional context.

2.0 THE BASIC MODEL

The reality remains a choice between free competition or regulation, between a market or planning. Substitution of one demonstrably bad regulatory system for another solves nothing. This report does contribute one significant insight to the British Columbia forest sector problem: at p. 35, it is stated:

> "*While these reviews provide a foundation for recommended approaches, they do not offer a sufficiently complete basis for solutions. Some major differences between B.C. and other regions encountered [sic] must be acknowledged.*"
>
> [emphasis added]

However, no practical solutions are offered. Neither the administrative difficulties nor the legal, social or financial disbenefits of the notion are addressed.

The model assumes three Crown tenure types:

1. Volume or area-based tenures held by the current operators on 50% of the forest land base.
2. Competitively bid, short term tenures on 25% of the forest. Eligibility for these to be restricted in some, as yet undefined, manner to meet the objectives of government.

3. Longer-term tenures, held by licensees without converting plants. Again the barriers to entry, methods of award and regulatory control of these are not defined.

The benefits and costs of this tenure mixture are not examined in the report. Our earlier comments on the likely negative impacts of implementing such a scheme still stand.

Again we regret the lack of comprehension of the significant differences between the report's perceptions and the real world. For instance in regard to the longer-term licences to be awarded to firms unencumbered by mills appropriate to the conversion of the timber harvest, we find, at p. 38, that these licences:

> . . . . *"do provide an analytical convenience, one which conforms broadly to the U.S., Swedish and Finnish categories of . . . non-industrial "private" timberlands . . . ."*

Having correctly identified the difference between B.C. and these other jurisdictions as the absence of private timber ownership in B.C. it is astounding that the report should then suggest that the tenure described can have any "private" characteristics. There is not one word to suggest that, at a minimum, to be considered at all "private" such firms would have to be free to cut when, where and how much they chose; matters that are currently so tightly regulated that operators have little more than utility status. In addition, to be truly "private", they would have to be the rent collectors: a notion far removed from the current government's approach.

3.0 THE MARKET PROPOSAL

The report is rather glib in its non-distinguishment of the proposed markets for timber and logs. These seem to be rolled into one bureaucracy. We discuss briefly each area:

1. The Timber Market

   In the model posited for Crown tenures, only the short term tenures have any claim to being "market" timber. Even these will constitute far less than a free market in timber given both the aforementioned regulations attendant upon their award and restrictions as to the bidder.

As a relevant aside, it is curious that in the lengthy literature review the report does not mention a paper[1] on U.S. Forest Service sales in the Pacific Northwest. Given the eminence of the authors it would seem appropriate to record their conclusion that the monopolistic behavior of the U.S. Federal Government in restricting supply caused a market failure of such monumental proportions that stumpage prices were forced 70-80% above their true value under an economically efficient scenario. (This of course contributed to the 1982 buy-out of timber contracts by the U.S. government.) What is to prevent the B.C. government from behaving in a similar fashion?

We conclude that the "timber market" proposed in the report does nothing that cannot be achieved by a relatively minor expansion of the present Small Business Programme and elimination of the so-called Value-Added (§16.1) sales.

2. The Log Market

Consider the assertion at p. 36:

> *"Given the importance of the Crown forest, a purely private, unsupervised market as advocated by many industry discussants cannot be recommended".*

This simple statement shows the whole report for what it is: a self-serving piece of poorly analyzed rhetoric. It would be equally as plausible to assert that given the importance of the Crown forest, the record of its management by various ministries and the seemingly limitless propensity of governments to tinker with its regulation, that a private market is the only solution to the dilemma that can optimize public benefits therefrom.

That being said, the sketchy proposal for a log market contained in the report seems like just one more bureaucratic black hole into which resource rents can be poured. The present log market may not be perfect but it is certainly not likely to be any less effective than that proposed as a replacement.

---

[1] Below-Cost Sales (1987) P.R. Hagenstein, C.S. Binkley, W.E. Brauner, P.A. Cardellichio and W.F. Hyde. Journal of Forestry, 1987.

4.0 IMPACTS

We reiterate our fears that implementation of the scheme as outlined would cause:

- legal and financial fall-out from further expropriation of tenure.
- reduction of available resource rents because of separation of harvesting and manufacturing.
- loss of "working" forest area as the environmental movement locks up tenure in the process of transition from one form to another.
- changes in the employment conditions of perhaps 50,000 persons.
- an excessive and unjustifiable bureaucratic cost to manage, oversee and audit the so-called markets.

5.0 CONCLUSIONS

At p. 35 we find:

> *"It should be noted that the introduction of a large, competitive market based on a dominant and continuing Crown forest ownership has not been attempted before. Timber markets elsewhere have evolved from a much more diversified distribution of property rights, or state timber has been sold or privatized. These alternatives are not provided in the assumptions given to this study, although to the extent possible private sector elements are incorporated. Thus the proposals in this chapter are not claimed as furnishing complete solutions. What they are meant to offer is a framework for a start."*
>
> [emphasis added]

We suggest, respectfully, that this be the epitaph for a poorly-conceived attempt at social engineering in the forest sector of B.C. rather than the dawning of yet another over-regulated thrust.

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REVIEW OF
TIMBER & LOG MARKETS
John de Wolf

Prepared For:

British Columbia Forest Resources Commission

by:

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New Westminster
July 1992

EXECUTIVE SUMMARY

This report critiques " Timber & Log Markets written by John de Wolf for the British Columbia Forest Resources Commission. The primary task was to provide marginal notation and a written critique.

This second draft by de Wolf and is a vast improvement over the earlier paper which was critiqued by this author in May 1992 (Review of Markets and Management, May, 1992). The concept of a Pacific Fibre Exchange has vanished and in its place arises a private "market organization" made up of industry participants. To protect the Crown's interest de Wolf postulates a "provincial regulatory agency" with powers to license.

Chapter 1 of the Report deals with a literature review of timber and log markets which examines log and timber markets in Scandinavia, The US South and in the Pacific Northwest. Variations in timber land ownership account for the different strategies undertaken in each marketplace. A salient finding of this research is the State or government's absence from log markets in all jurisdictions even Scandinavia. The State vested its interest on the stump in all forestry jurisdictions.

Most forest jurisdictions have market imperfections including monopsonistic power but the more private ownership a forest market has the more efficiently it operates. A large number of participants is another key feature of an efficient market.

Chapter II studies and contrasts timber and log markets in B.C. and the US. Private ownership and lack of competitive timber sales are the essential differences between American and B.C. markets. B.C. markets lack competition, have a high degree of concentration and seek to control supply as opposed to buying it on the marketplace. Most of this imperfect behavior stems from public ownership, tariff barriers, lack of competitive sales and a tenure system which permits large leases to be held for minimal cost.

Chapter III starts by warning that a competitive market based on Crown ownership has not been previously attempted. This author disagrees with the Reports recommendation to create a private market organization with provincial regulatory oversight. In contrast this author believes the Crown should sell a minimum of fifty per cent of its timber on the stump, equalize stumpage between competitive and tenure timber and stay away from the log market. Once more competitive timber practices are in place this author believes the VLM and Interior markets will behave in a more efficient fashion. Finally this author believes that true market efficiencies will not be achieved until there exists substantial private forest holdings

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INTRODUCTION

This report reviews the study " Timber and Log Markets by John de Wolf for the British Columbia Forest Resources Commission. The purpose is to provide a critique by way of marginal notational comments, appended brief overall comments and a written discussion of any significant disagreements with the economic analysis used in the study.

This task was completed by two methods. The first was to do a notational review of the contents. Areas of agreement are underlined in yellow. Areas of disagreemennt or errors of fact are underlined in blue. Marginal notations expanded on this agreement/disagreement model with personal examples to make the point.

The second part of this review are a chapter by chapter and page by page critique by way of appended comments. These comments are meant to flesh out the marginal notations. The comments also suggest how the reforms proposed in this study might better be accomplished.

The conclusions quickly recapture the main areas of agreement and disagreement and the factors that are required to achieve a competitive fibre market.

Chapter 1

COMMENTS ON TIMBER AND LOG MARKETS IN THE LITERATURE

Timber Sale Competition: Mead et al (1983)

1 Important to note that competition and the number of bids increased over the past twenty years in the Pacific Northwest and that concentration levels did not increase and were acceptable.

2 Agree that bid prices are essentially future prices as bidders factor in as many market variables as possible and gamble on future price trends. However market behavior in the 70's and to a lesser extent in the 80's was driven by inflation which forced bidders to go above price levels that were viable on the current marketplace. The low inflation 90's will see this type of bidding behavior receding.

3 If the Crown wants to maximize returns sale sizes, duration, and payment terms should be set in accordance with buyer capabilities and preferences. At the same time the playing field must be seen to be even with no preferential treatment given to one group of bidders over another no matter how politically expedient this might be. A great part of the lobbying now occurring in Victoria involves itself with preferential treatment. Another hazard is the government's preference to promote other societal goals through the bidding process (added value, native affairs, etc.) which will have an affect.

4 The Crown should be very careful about entering into negotiated sales with only one party. This tends to breed a lot of distrust among other market participants.

5 A high number of bidders contributes to high overbids or bonus bids because a good quality sale attracts a lot of attention and high bonus bids.

Timber Demand Influences: Haynes and Adams (1985)

1 It is interesting to note that the Tamm model predicted stumpage increases with removal of log export restrictions and a decline in lumber production of seven per cent.

Market Structures and Processes: Scandinavian Research

1 In Scandinavia there are many sellers and relatively few buyers whereas in B.C. there are few sellers in relation to the number of buyers.

2 The monopsonistic behavior experienced in Scandinavia and the U.S. South will be a factor in the Interior where there is a relatively even distribution of forest and a concentration of mills and where transport costs play a big factor in pricing. With the exception of Prince George and Kamloops, geographical monopsony will be a fact of the market in the Interior. However private timber owners can choose not to sell to a mill during periods of low prices and can affect pricing by withdrawing from the marketplace in a temporal fashion. This will not be the experience on the coast where water transport equalizes distribution costs and where all mills are accessible to the timber source.

Timber Submarkets: Sawtimber and Pulpwood

1 Smallwood and low quality sawlogs do transfer between the pulpwood market and the sawlog market and sorting specifications are changed frequently to take this dynamic into account. Thinning does not come into play as yet on the Coast. Because timber stands are appraised and evaluated on the whole (all the timber must be harvested) a rise in pulp prices can have a major impact on the economic viability of a stand of timber and this impact increase as the stand decreases in value. Marginal Northern stands in the Steward area with 70% pulpwood content live and die by pulpwood prices. Government waste policy has a large impact on pulp prices. Zero waste tolerance forces the utilization of pulpwood even below the margin and has the effect of depressing prices.

Stumpage Markets in the U.S. South: Newman (1987)

1 Important to note that even though monopsonistic power existed it did not prevent a competitive stumpage market.

Monopsony Power in Timber Markets: Binkley (1991)

1 Neither zone pricing or uniform roadside pricing exists in the Vancouver Log Market with one exception. Scott Paper has a species monopsony as the major buyer of Cottonwood for its New Westminster tissue mill and practices uniform pricing.

2 Binkley reports that mills will seek to increase self-supply capacity because it helps to depress outside log prices especially if the mills can supply this source with cheap public

leases. This is exactly the case in B.C. where the mills have access to vast quantities of self-supply timber and there is no holding or opportunity cost of this timber. Unlike private timber lands which are expensive to purchase and have a high opportunity cost that discourages mills from achieving total self sufficiency B.C. mills maximize self-sufficiency because it does not bear a punitive cost. This helps to explain how log values on the VLM remain depressed compared to other forest jurisdictions.

General Comments on Chapter 1

1 Other factors affecting VLM timber and log pricing:

- -Ad-hoc log export policies with no continuity from year to year.
- -Changing forest policy which increases costs and uncertainty for participants.
- -Low deposit prices, lack of performance bonding, and rollover of timber contracts without penalty. These all assist in creating speculative bidding behavior and prevent inefficient operators from exiting the market.
- -AAC cut controls which forces licensees to harvest during low parts of the cycle and restricts cutting at the top end which tends to exacerbate price swings.

Chapter II
COMMENTS ON TIMBER AND LOG MARKETS IN B.C. AND THE US

Introduction

1 Effective markets reduce reliance on self sufficiency but only if the cost of self-owned wood is comparable to costs being paid in the market.

2 It is very true that the radically different ownership patterns in B.C. and the U.S. preclude any equivalence.

Existing Markets in the B.C. Forest Industry.

1 There is very little private timber land in Coastal B.C. and most of which is owned by a few large companies (E&N railway grants). Timber is also derived from Indian Reserves and from Timber Licenses .

The Coast Region: The Vancouver Log Market

1 VLM highly concentrated (90.5% top eight and 70.7% top four)

2 Disagree with the findings of the Select Standing Committee regarding the number of sellers. There is concentration but there are more than 20 Sellers in the VLM. Our company handles approximately 30 to 40 separate selling accounts alone.

Size and Nature of the Market

1 The committee should be cautioned at accepting COFI's findings at face value as their game plan is to maintain the status quo.

2 A lot of the volume sold through the VLM is subject to trade, especially chip trades which does distort pricing and creates barriers to entry. Chip pricing which has not been examined by the author is oligopsonistic in nature. Chip values consistently underprice the costs of pulp logs plus conversion costs. Non tariff barriers make it difficult to sell chips offshore but does not prevent pulp mills purchasing offshore chips which serve to maintain low prices.

3 It should be noted that the VLM which is described as an informal, local, cash market is no different than log markets in the U.S. or Scandinavia. Like the VLM these markets are

unsupervised, operate by rules of contract and property law, have no fixed or formal location, membership or rules, and compiles no published or circulated report of listings (other than private news sheets). Yet these markets have been reported as very efficient (with the U.S. South described as the most efficient in the world). The VLM is not deficient as a result of its structure.

4 The VLM does not have COFI as its location. Other than reporting on inventory levels and collecting log prices on behalf of its members it has very little involvement in the market.

Industry Participants and Market Rationale

1 Although COFI reports the volume share of Coastal log output through the VLM has risen this is not he experience of our members. The major licensees release far less wood into the open market than was the case twenty years ago and what is offered requires trade material. The introduction of the SBFEP program ten years ago has increased the volume of logs through the VLM.

2 It is the experience of our members that most of the logs transacted by brokers through the VLM is from the SBFEP and other market loggers and not for the major firms. Brokers transact very little for the major firms who maintain their own log trading staffs although they do from time to time purchase logs from the major firms.

3 Agree that highest prices are generally for SBFEP logs. However the majors achieve the highest returns on very high grade booms. SBFEP loggers do not get access to enough of this high grade production to sort for it. The more that logs are traded the less value is shown in the actual transaction. Brokers and independents do not engage in trading to nearly the same extent as is practised by the mills although it is increasing. As present supply lines shrink a from of hoarding starts to occur and one cannot secure logs without having something to offer in reply. In a market with many more buyers and sellers this type of activity would not be as dominant.

4 The VLM is an important source of incremental supply for the majors. As tenure is now structured this leads to another market imperfection. Because the major licensees have such a large volume of cheap self-supply timber it can enter the SBFEP program (through surrogate bidding) and bid above the market for this incremental supply. The overall cost of logs is still low and economies of scale are achieved in the mill.

5 Even though the VLM operates in an imperfect manner it is important to note that all participants regard the market as indispensable for their wood supply operations.

6 The Report quotes a discussant (a log trader for a Major company) as stating that logs are now sorted more consciously. It should be noted that brokers have been doing this for a long time previously. Tenure allowed the Majors to be rather blase about sorting for the highest end use. The SBFEP program was instrumental in showing the Majors how extra value could be created out of the log profile. It is ironic that the FRC recommends that this program be abolished and replaced with a Bid Proposal program.

7 Even if the export business did create a sense of value amongst the major integrated firms it did not translate into higher log prices being offered on this wood and it is still the international marketplace, specifically the Japanese who lead the market in log prices. This is the reason that the independent sector and the brokers who represent them want continued access to this market. It is precisely these same licensees who exported logs in the early eighties and then abandoned the export program when lumber markets improved who are blocking independent market loggers now and offering much lower log values.

Market Imperfections in the VLM

1 Concentration of tenure with minimal holding cost

2 Tariff and non-tariff barriers (100% export tax and blocking)

3 competitive timber sales
    -lack of
    -no continuity
    -not enough forward planning
    -low deposits
    -no performance bonding requirements
    -ability to roll over from year with no penalties

4 Trading and hoarding

5 MOF policies
    -AAC controls
    -zero waste
    -restrictions on timber movement
    -scaling policies

The Interior Industry: Informal Regional Markets

1 Our experience is that the VLM is a far more complex and developed market than the Interior where geographic monopsonies are the rule. The Interior has more non-quota timber which might explain the authors contention that it is more diversified than the VLM. It is my experience that on the interface between the Interior log markets and the VLM that the VLM commands higher prices for a similar log with the exception of small chip-n-saw logs which Interior mills are better able to process.

Competitive Markets and Supply Diversity in the U.S. South

1 The diametrically opposed private ownership pattern is of paramount importance and explains why the U.S. South is the most efficient in the world and why B.C. has such an imperfect marketplace. This really is the crux of the matter.

2 Because there is such a diversity of ownership, and because there is a real cost associated with owning private timberlands forest companies do not necessarily maximize forest industry-owned land and have on average settled at about 30-35% controlled land.

3 Because most forest land is privately held firms manage their lands for maximum profit and are not legislated to manage for multiple use.

4 It is the variety of private land owners that allow a multiplicity of market mechanisms to occur.

5 Again it is important to note that there are no official or systematic basis of reporting transactions although they are well known to market participants. Private market letters exist to follow the timber trade. This networking and informed knowledge is exactly what drives the VLM. It begs the question why the author recommends a provincial log market with all types of reporting requirements.

The Pacific Northwest: A Public/Private System

1 Why is the PNW stumpage close to four times the level of Coast stumpage in B.C.? Here, as a participant in both markets, are the reason I think stumpage values are higher:

- -Stumpage is determined by competitive tender not by administrative fiat.
- -Access to overseas log markets is a prime factor.

-Generally better quality timber (less pulp component).
-Lower logging costs because more developed infrastructure, not as remote, lower labour costs, lower machine costs, lower fuel costs, lower overhead and lower taxation levels.
-Less uncertainty and risk: In the PNW logs are bid, harvested and sold based on U.S.$ and scribner scale. B.C. logs are bought and harvested on metric scale and Canadian $ but sold on Scribner scale and U.S.$

Timber Sale Policies and Methods

Federal Timber

1 An examination of federal timber sale policies would bring to light many of the problems bedeviling the B.C. log market. The federal government is are not profit oriented, are heavily bureaucratized, interfere in the market, lack continuity (now becoming critical) and have rather bizarre bidding procedures.

2 Although timber sales are and always will be bid above their current breakeven from time to time depending on the successful bidders market perspective this is not the factor that it was during the inflationary 70's and 80's. Defaults were massive in the early 80's as U.S. fiscal policy took a dramatic turnaround and interest rates went skyward as inflation dropped, but that was the only time there were defaults on such a grand scale since the Depression. Even then the State exacted a heavy penalty in cash or timber equivalents for defaulters unlike the case that exists in B.C. for non-performers.

Log Markets in the U.S. Northwest Region

1 Again it is noted that although the PNW market is considered fairly efficient (not as efficient as the U.S. South but then again, the State owns more of the timber supply) there is no formal organizational element, no require reporting, and no official sorts.

2 The state vests itself of its timber interest on the stump through competitive timber sales. Mechanisms such as bonding requirements, surety bonds, deposits and cutting bonds ensure that the State secures its interests in a very efficient market oriented manner. Companies that do not have a good track record or bid above their carrying capacity are not able to secure bonding.

3 Other than ensuring that all logs are properly scaled the State has no interest in the log market.

4 Bureaucracy is kept to a manageable level because the Department of Natural Resources in Washington is mandated to operate on a budget of 25% of the stumpage revenue. This also ensures sale continuity.

General Comments on the PNW

1 Member companies of our Association operate in a very similar fashion as do the players in the PNW. We operate yards, set sorting specifications for a wide variety of export and domestic sorts (25 and up sorts are not uncommon), set or negotiate prices for both purchases and sales, shop the product for the highest price, custom cut to gain maximum value, make trips overseas to better assess the market, Like the PNW it is highly dynamic and from time to time companies go under and new one emerge. Participants in the B.C. independent timber sector must be alert and flexible to be successful (and they must be good political lobbyists, wordsmiths, and attendees of various government appointed commissions which have the capability to legislate their livelihood out of existence). Our major problem is that we have access to so little of the provincial timber base and we are highly constricted by tariff and non-tariff barriers.

Market Approaches from the Regional Models

1 I question whether the bunching of federal timber sales was due to buyer interest. I'd speculate that bureaucratic inertia would be closer to the truth. SBFEP sales tend to come in clumps from the regions (usually during the fall and winter when it is most difficult and dangerous to assess the sale.)

2 It is very true that the lack of private timberland is the major constraint on the provincial timber market and does not allow it to operate as efficiently or in as complex a fashion as timber markets where private timber holdings form the majority.

3 In B.C. land is owned by the Crown, timber is controlled by a small group of licensees through restrictive tenure arrangements, and the logs and chips which flow out of that are constrained by government policies. It is a wonder that the VLM works as well as it does.

Chapter III

COMMENTS ON IMPLEMENTING A WOOD FIBRE MARKET

Literature, Regional Models and a Market: A Recapitulation

Before we proceed any further we should carefully read the warning at the bottom of Page 35 of the Report

IT SHOULD BE NOTED THAT THE INTRODUCTION OF A LARGE, COMPETITIVE MARKET BASED ON A DOMINANT AND CONTINUING CROWN FOREST OWNERSHIP HAS NOT BEEN ATTEMPTED BEFORE.

It does not sound that the author of these recommendations is willing to place much of a guarantee on their success. This is in marked contrast to the first draft where the direction was toward a brave new world.

1 It seems as though a lot of time, money, and energy has been expended only to offer proposals which will not furnish complete solutions but are only meant to offer a framework for a start.

Private Markets and Public Timber

1 The stress that the author places on the role of private timber ownership as a condition of an effective market in other forest jurisdictions of the world is absolutely correct and of paramount importance. It is my belief that the public ownership factor which is B.C's misfortune to be burdened with will prevent a truly, world-class market from ever being a reality here.

2 The Report's observations regarding efficient timber jurisdictions are so fundamentally important that they bear repeating:

- -private markets are the rule.
- -public timber operate within this private market as a component of supply.
- -log transactions are in the private sector even in jurisdictions where governments own timber.
- -the market operates without government supervision or control (even in Socialist Sweden).
- -intervention by the state in the operation of the market has been relatively limited.
- -transactions are controlled by the normal rules of business and the legal framework of the state.
- -accepted rules and conventions exist and may be institutionalized (scaling, grading, pricing, payment terms, etc.)
- -public timber and private log markets can co-exist

4 I disagree with the Report, based on the evidence presented, that "a purely private, unsupervised market cannot be recommended". All the evidence from Socialist Sweden to the PNW to the observations of the literature review suggests that the Crown should stay away from the log market. The evidence suggests strongly that the Crown should divest its interest (duly protected) on the stump as is the case in other efficient forest jurisdictions where there is a public timber base and a private log market.

5 I agree with the Report that a B.C. Log Market or an official B.C. Timber Authority as recommended by several government commissions is not the desired route for an efficient timber or log market.

Marginal Supply vs. Market Reliance

1 I agree with the Report that the VLM can be characterized as incomplete; the reasons for this stunted form are tenure, a lack of private ownership and tariff barriers. That is it! Remedy these shortcomings and forget about a regulatory authority.

2 All the complaining aside I believe the tenure holders of this province would quickly excel in a market driven timber and log economy. They have excellent log trading staff and the people and expertise exist to make the expanded provincial market work as effectively as possible given the constraints of public ownership. Most majors are very familiar with incremental outside log purchases from the SBFEP program, log brokers and other sources which does constitute the efficient component of the marketplace.

Commissions Assumptions Affecting Market Structure.

1 The Commission should be clear on the concept that logs and timber are not synonymous. Timber markets involve selling standing trees on a stumpage basis, log markets are based on the values associated with the merchantable portion of the tree which have been harvested, transported to a more centralized location, sorted, scaled, processed and packaged into a saleable unit (a truckload, a boom or a shipload). Timber markets organize differently than log markets and vice-versa although they are inextricably bound. There are also temporal differences. Timber does not generally degrade over time whereas logs must be marketed expeditiously or stored in selected safe locations to escape the ravages of insects, sun, adverse weather and theft.

2 I strongly disagree that a competitive timber market can be established if it is recommended that a great part of this market is to be made up of timber **allocated** to a new group of tenure holders (defined as non-industrial). Once again we are slipping down that greasy slope. Who does the allocation and what are the criteria?

3 If one of the assumptions is that the market should be the basis for the pricing of Crown stumpage, I propose that the timber market can serve this function very well but the log market cannot as is recommended in the Report. It is my strongly held belief, which is supported by the evidence in this Report that the Crown should divest of its interest on the stump. That is the Crown should be involved in, regulate, oversee, etc. the **timber market** and should not be involved in, oversee, regulate, etc. the **log market**. It would be difficult to accomplish, serve no purpose and cost a lot of money and time. Why again embark on something no other forest jurisdiction is involved in.

4 How will the timber market be the basis for pricing Crown stumpage. Very simple. The stumpage overbids for the fifty per cent of timber that is competitively tendered will be the basis for increased stumpage prices to the other fifty per cent of the tenured timber supply tenure until the two are in equilibrium (taking into account different management responsibilities and costs and assuming that both have equal access to the international market). This serves a lot of very important functions:

-It prevents tenure holders from overbidding competitive timber and averaging down the cost of logs

-It would reduce the inherent advantage that tenure holders have in the timber and log marketplace putting all market participants on an equal footing which is a necessary condition of an efficient market.

-It would prevent B.C. ever again being subject to a countervail based on lack of competition.

-It would reduce the value of quota to zero and likely bring more wood into the competitive marketplace as tenure holders reduced their holdings to those more in line with experiences in other jurisdictions.

5 I offer it as a solution that the government would have a lot less difficulty meeting its goal of fifty per cent competitively tendered timber if a policy of equalization between competitively tendered stumpage and appraised stumpage was phased in over a period of time.

The Supply Structure of the Harvest

1 Dividing the AAC between those who own processing facilities and those who do not is a very arbitrary line which will cause no end of problems. Historically companies who have done well logging have moved into the sawmill or pulping sector and certain firms have gone the reverse route. Creating this artificial barrier serves no clear purpose. Companies should be encouraged to enter into a processing facility and this will act as a major disincentive.

2 This might provide "an analytical convenience" but would not serve any other purpose. This so-called non-industrial tenure holder who in supply terms would be the equivalent of a private forest owner is no such thing. A private forest owner can decide to enter into conversion industry at his pleasure. How is the process of arriving at this type of tenure-holder arrived at? Does they bid on tenure or is it granted at the pleasure of the Crown?

3 As explained above the Crown's interest in the market can cease once the stumpage is paid and stumpage prices can be based on (timber) market prices.

Concentration Ratios on the Demand Side

1 Participants should be allowed to expand and to fail. This is a necessary function of an effective market and will in the long run increase stumpage values to the Crown.

2 The experience in other forest jurisdictions points to a more diverse marketplace and the warnings from some integrated companies that they would use any advantage to secure timber is so much hot air. This is assuming of course that tenured timber stumpage is equivalent to that in the competitive sector. Otherwise the playing field remains as tilted as it presently is. Large integrated companies also have large overheads and sometimes make large corporate strategic errors. Smaller niche players should compete very well in a more competitive timber arena.

3 If the cost of holding tenure remains extremely low (as opposed to holding private land which even if acquired inexpensively many years ago now hold a huge opportunity cost) and stumpage differentials remain then there should be a concern over predatory behavior and corporate concentration.

4 "Position Limits" are very difficult to monitor and the present position limit on SBFEP participants (three sales) is easily circumvented through surrogate bidding.

Buyers and Sellers in a Competitive Market

Introduction

1 As stated here the criteria for an efficient, equitable market are:

- a sufficient number of participants
- equitable access
- full information
- continuity or sufficient frequency of trading

These are important criteria. Under the proposed three tier system do the integrated tenure holders, the non-industrial tenure holder and the participants in the competitive market have equal access. The non-industrial tenure holder is barred from owning a conversion plant and unless stumpage is made equitable across all the market participants there will be inequitable access to the market. Quota is by definition inequitable access.

2 With redistribution there should be a sufficient number of participants, information will be open on all timber auctions (as it is now in the SBFEP program) and continuity of timber auctions should be a vital aspect of provincial forest policy. It should not be that difficult to set up a timber market which fits all of the above criteria.

Bidders and Buyers in a Competitive Market

1 Sealed tender is the best method by which to auction timber sales. Oral auctions cause spite bidding and a lot of ill feeling between participants and is also much more susceptible to collusive behavior. The sealed tender auction process in the SBFEP program works very well now. Oral bidding is also very expensive and time consuming as participants have to fly to the bidding location for each sale.

2 Minimizing uncertainties and inadequate information is paramount for encouraging participation and this is not limited to good cruising information. Continuity in forest policy, and clearly stated and understood bidding practices are also important. The Section 16.1 program has so much uncertainty and secrecy that it discourages legitimate bidders who are fearful that other bidders with more political pull will be awarded the sale.

3 A mix of lump-sum and time-of-harvesting pricing scenarios should be attempted unless it becomes clear there is a major disadvantage to one of the systems. In a time-of-harvesting system there should be an adequate deposit and a secure performance bond to reduce speculative behavior, and reduce the risk to the Crown both of unpaid stumpage and bad harvesting practices. This is one of the weak spots in the SBFEP program as it exists.

4 Lump-sum pricing could be difficult to monitor in a remote location as boundary lines are more arbitrary and this system leads to trespass abuses. Time-of-harvest payments aren't so critical to trespass transgressions but carry with it the risk of unscaled and thereby unpaid stumpage. The risk of this behavior varies by district.

Sale Practices of Public and Private Sellers

1 · How are the non-industrial tenure holders awarded timber rights? By timber auction or by allocation? Remember that timber allocation in the early sixties got us into the tenure mess we now have.

2 It is a long stretch from non-industrial tenure holders to private forest owners in other forest jurisdictions and there is no proof or precedent that they will treat their tenure as if they were private holdings. The Crown will no doubt impose a list of restrictive behavior the first of which is explicit in the tenure in that they cannot engage in conversion activities.

Public Timber in the Market

1 Federal timber sales do not offer the best model for timber sale auctions and the Crown might better look at its considerate experience in the SBFEP program or look to DNR bidding procedures.

2 Longer contract lengths will increase bid prices: even if the bid was mistakingly tendered too high (sometimes even experts miscalculate the value of a stand and the theory of the biggest fool comes into play) the market cycle will help to alleviate the error.

3 Inflationary bidding was a common practice of the past but assuming prices will rise dramatically in the future in a non-inflationary period is very risky behavior.

4 Uncut timber volumes do act as a buffer to swings in timber pricing as do inventories of logs act as dampers on log price variations.

5 The current practice of the MOF to grant extensions on timber sales without penalty creates more speculative bidding as participants know they can hold a sale beyond the expiry date.

6 The size of a timber sale should be flexibly dealt with and should take into account both bidder preferences, site specific factors and economies of scale (a lot of small sales might be preferred by local bidders but place an enormous strain on the management agencies).

7 Sale frequency is an extremely important consideration as market participants usually have heavy financial obligations in the form of equipment costs and must be assured there will be a steady flow of timber sales.

8 Infrequent sales cause panic buying and hoarding behavior.

9 Price reporting of timber sales is easy to accomplish and occurs both in the government and private sector. Log and final market price reporting is better left to the demands of the private sector.

"Private" Timber and Logs in the Market

1 The observations in this section are correct for the most part aside from the "private" aspect of this non-industrial group who have had timber allocated to them somehow.

2 There is no doubt the market will become more competitive and that in the long run as efficiencies are captured and new markets developed stumpage prices should increase.

Conclusions and Recommendations from this Study.

1 Why is it that when all the evidence presented in this Report indicates that the Crown should stay out of the log market does the conclusion recommend the exact opposite. "This more organized and disciplined approach has been adopted in many industries, professions, and exchanges" but not in any of the forest marketing jurisdictions that were examined. If the Crown involves itself only in the timber market (which it can directly control through the existing apparatus of the MOF) it does not need to set up a regulatory agency.

2 If this Report is so cautious about COFI gaining control of the agenda how will it restrict the members of COFI from doing exactly that.

3 If the Crowns interest can be better dealt with though an efficient competitive timber market by which it collects its economic rent in the form of stumpage what is the necessity of this huge proposed "Market Organization" which would be imposed from on top and which is not really necessary? Why should non-members be obliged to sell through licensed brokers (even home-sellers have the option of by-stepping the real estate agent if they feel they can do better)?

4 If the organization envisaged was encouraged on a voluntary basis and could deal with disciplinary measures, conduct rules, market trading criteria it might stand a chance of success. It need not be linked with the Interior and it does not need regulatory oversight. Why licensing is necessary is questionable as log traders do not deal with an unsuspecting public but with other knowledgeable peers in the business. A lot of honour exists in the system and someone who doesn't abide by the rules would be quickly frozen out if not taken to court in a civil action.

5 If a board such as this were to be established it would be paramount that the redistribution of tenure already be enacted, if this were not the case the organization would be controlled by the present tenure holders.

6 There should be no difficulty with the MOF continuing to hold timber auctions. The MOF should mandated to place an allotted amount of volume on the market each and every year and this process should be scrutinized and audited.

7 R.M. Coase is quite correct that legal rules should exist governing the rights and duties of transactions in "public" markets but these obligations can be met in the timber market and do not need to be attached to the log market which is a "private market" in the fullest sense.

Timber and Log Market Operations

1 The MOF should continue to carry out timber auctions.

2 None of this market organization behavior is necessary unless it is deemed to be so by the members of the voluntary organization if the Crown relinquishes its interest on the stump as is the case in all other forest jurisdictions that were examined.

Market Methods and Measures: Rules and Options

1 With respect to the timber market the recommendations regarding bidding methods, sale size, sale duration and frequency, and pricing strategies are effective.

2 Timber sales should also have significant deposits, fixed terms with penalties for extensions and performance bonding to keep all the participants honest.

3 If former tenure holders want to "contract" or bid on their former volume they will find a method to do so and no amount of "position limits" will prevent this. Present day practices in the SBFEP program bear this out. What will keep everyone on an even playing field is to increase non-competitive timber stumpage to an equivalent price as competitive timber. This will prevent the sharks from swallowing the mice and reduce unfair predatory bidding practices.

4 Hoarding will only be prevented if sales are put up on a frequent and continuing basis and if there is a substantial cost in holding a sale for any period of time.

The Crown Selling Agency: Revenue and Responsibility

1 Why can't the MOF, an existing and experienced agency deal with timber sales?

2 Sealed bids should be adopted for all but emergency situations

3 The SBFEP could serve as the set-aside program.

4 The Reports problem with market pricing to establish stumpage because of volatility would not exist if stumpage was determined by timber market prices as achieved through competitive sales

The Implementation Process to a Market

1 My recommendations regarding the Crown's interest would not require the formation of a Crown Agency let alone any further bureaucracy. The MOF would be responsible for an expanded auction process with a lot of the extra work being contracted to forest consultants.

2 The Crown could tender some very large sales with the express purpose that these sales could be re-tendered to other parties as the winning bidder saw fit. This would take some of the management pressure off the MOF. This is basically the concept of the non-industrial tenure holder with the exception it should not be limited to those without conversion facilities and they should be competitively tendered.

3 A log market organization can be imposed upon the industry of that I have no doubt but I am skeptical that it will accomplish much other than generate a lot of meetings and paper. The industry clearly doesn't see the necessity for it and the Crown's interest can be dealt with in the timber market.

4 Fortunately this implementation process does not constitute a plan. Since it is only a proposal for which constructive improvements are invited and sought that is the way in which it is being treated.

5 Again as in the previous draft the Report jumps ahead of its observations and findings from other forest jurisdictions and formulates a complicated plan (although a lot less complicated than the previously) which will be expensive and not as free market as it seems.

6 The recommendations that are presented by this critiquer are offered up as a simpler, cheaper method by which the Crown can achieve its stumpage goals and in the process create a more effective and efficient timber and log market.

7 Achieving the degree of efficiency found in the U.S. South and in the Scandinavian countries will demand private forest ownership. Nothing less will do.

CONCLUSIONS AND COMMENTS

Chapter I

1 This reviewer is not an academician nor a resource economist by training so that my objective in reading the literature review was to contrast and compare the findings of the various authors with my practical experience in the log and timber markets of the VLM, the Interior, and the PNW. In general their findings regarding market behavior and the elements of an effective, competitive market fit very well with my personal observations although couched in somewhat different language. Certainly the market imperfections of monopsonistic behavior as described by Binkley have a bearing in B.C.

2 Listed below are the elements that create an effective market as gleaned from the literature review:

- private timber holdings are the norm in effective markets
- log markets are in the private domain in all cases
- many buyers and many sellers
- timber sale sizes should vary as to volume, length, and payment terms
- log export prices cause stumpage prices to rise
- the higher the quality of the timber stand the greater number of bidders can be expected.
- destination of logs can vary between the sawlog, pulp and plywood markets depending on price levels.
- even though a degree of monopsonistic behavior existed in the US South it did not prevent a competitive marketplace.

3 Listed below are the elements that prevent a market from operating properly as described in Chapter 1:

- regional monopsonies form as a result of transportation cost differentials and creates different pricing patterns
- monopsonistic buyers with self-controlled timber will utilize this source to maintain low prices in the market even to the point where wood from self-controlled sources is more expensive. This is particularly true if the self-controlled timber is held in cheap long-term leases.
- This explains the mills preference to seek self-supply if the initial capital outlay is low.

Chapter II

1 It requires an effective market for firms to reduce self-controlled timber to that of other forest jurisdictions

2 Self-controlled timber supplies will continue to be a goal of buying firms until the cost of holding timber rights is in equilibrium with the market. This dynamic is created naturally where private timberland co-exists with effective log markets. Buying firms maintain an equilibrium of self-controlled and market timber which is constantly altered by interest rates, price of forest land, stumpage values, log prices and outside supply sources.

3 The lack of private land in B.C. and the minimal cost of holding Crown cutting rights (quota) will cause buying firms to continue maximizing self-controlled cutting rights.

4 B.C. forest markets have no equivalence with US jurisdictions because we lack private forest lands and because we do not engage in continual auction of State (Crown) timber.

5 Even though tenure constrains the VLM and keeps it from behaving effectively the market is vital to all the participants

6 Timber markets have a high degree of public involvement in the form of timber sale auctions from State lands. Log markets are in the private domain.

Chapter III

1 Creating a competitive market based on continuing Crown ownership has not been attempted before.

2 The very fact of continuing Crown ownership will create an imperfect market. The necessary dynamic of the opportunity cost of private timberland (self-controlled timber) versus the cost of logs in the market is missing in the B.C. marketplace.

3 Log markets in the other forest jurisdictions operate without government supervision even in Scandinavia. Normal trading practices, contract and property law maintain a disciplined market. Accepted rules and conventions exist and are institutionalized.

4 Public **timber** markets and private **log** markets can effectively co-exist.

5 I believe the private log market would quickly adapt to a more competitive timber regime. My experience with the log and timber buying fraternity in this province gives me the confidence to state that they are as capable and competitive as their cohorts elsewhere.

6 I disagree that non-industrial timber should be allocated to anyone. I believe it is feasible to competitively tender large tracts of timber which would attract the attention of not only mill owners but insurance companies, pension funds etc. as long as the tenure on these sales were as close to fee-simple as possible. The successful owners of these sales would have the right to enter into re-sales, long term contracts, or to re-sell their positions. Anyone should be able to bid on these sales as long as they can meet the fiscal and regulatory conditions of the contract.

7 Of prime importance is the necessity of balancing tenured stumpage with bid stumpage (including bonus bids) so that tenured holdings aren't the cheap supply source they now are. This would simulate the opportunity cost of private timber land and reduce the maximizing of self-controlled timber as now exists and would continue to exist if there were a two-tiered stumpage system. Equalizing stumpage between the competitive and non-competitive systems would cause a lot of market imperfections to disappear. It also means that the Crown doesn't need to enter into the log market even on a regulatory basis. The two systems can be brought into alignment through the monitoring of bonus bids on a stand by stand and region by region basis and adjusting non-competitive stumpage on an iterative basis until an equilibrium price is established.

8 Based on my personal experience plus the findings of this and the previous report I cannot support this Report's recommendation to create a "private" log market organization with a "provincial regulatory agency" oversight.

9 I recommend that the Crown expand its timber auction process to a minimum of fifty per cent of Crown timber through the existing facilities of the MOF (subject to review and audit) and that the other fifty per cent pay an equivalent amount of stumpage (with cost differentials factored in).

10 If this course were followed the Crown's interest would be fully discharged on the stump even on non-competitive timber.

11 The Crown should stay out of the log market.

12 These relatively simple changes would go a long way to creating a more efficient log and timber market.

13 Market imperfections will continue to exist even under this new regime of Crown-controlled timber which will not disappear until fee-simple forest ownership is introduced in line with other efficient forestry jurisdictions.

NAWITKA

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MEMO TO: DERRICK CURTIS

REF: LOG MARKETS IN BC - STUDY BY JOHN DE WOLFE

FROM: NAWITKA RENEWABLE RESOURCE CONSULTANTS LTD. VICTORIA

George S. Nagle PhD RPF President, Resource Economist

GENERAL COMMENTS & SUMMARY REACTION

This is a good review; GENERAL feasibility and desirability are well stated; but we have some problems with significant details, and the proposed timing.

- objectives (not fully stated)
- pre-conditions for a market to work effectively (incomplete and not shown how to improve)
- conditions of BCRC proposal (over-ambitious, undocumented)
- tasks and schedule to establish market (unrealistic)
- achievment of objectives: desirability (unlikely)
- ultimate feasibility in operational terms (not with these methods and time-frame)

In places we (Nawitka) had the feeling that the analyst was levering his own area of expertise a bit too far into detailed industry workings (in BC and other regions cited), based mainly on academic studies.

The objectives we attribute to attempting to establish effective timber and log markets are unlikely to be served in this manner.

In sum, we are not convinced by this document that the path outlined is the best one to get to increased log markets (and achieve related objectives) in BC, from where we start in 1992.

The following notes have been summarized from copious margin notes in readings by our analysts, and general consultations with other experienced BC forest sector analysts/operators.

Please let us know if we may be of further service with respect to your review of this interesting document.

OBJECTIVES (attributed by Nawitka)

equitable revenue from public asset sales (timber sales) (note problems with maximum revenue at this level in relation to other objectives; eg regional economic activity)

regional (BC and community) economic activity (Value Added in BC; Stability of employment, VA)

broad efficiency in resource allocation in sector (long run competitive position)

equitable dealings with external and internal trading partners (long run access to markets) note double edged sword: USA countervail; sophisticated Japanese quantity restrictions;

sustained forest resources - economic, cultural, biotic dimensions

PRE-CONDITIONS FOR MARKET SUCCESS

Certain preconditions are essential for effective operations of raw timber markets to achieve desired financial and welfare objectives. Primary example: factor markets.

timber - the proposal attempts to fix, but not very cleanly. Existing TFL's other tenures remain in place. Only some have to sell into market? Many imperfections remain in each Region/subregion of BC.

labor - not in BC forest sector yet. Many examples of exercised labor power in history of BC sector. Structural adjustment having its effect, but long way to go. Also affected by other elements of the BC economy eg BCGEU, BCTF.

capital - BC/Canadian banking system not very competitive; FTA may improve over time, but will take time. Immediate reaction to large demands for loans to levered loggers likely to be cool. Even worse in the face of $billion loans to existing players. (try to imagine the banks encouraging competitors to Dome in the Arctic, at a critical time)

This problem also goes multi-national, through vertical market power which grants/denies access to export markets (notably in Japan).

international product markets - there is great variation in competitiveness, access, regulations, between major BC markets and between various forest products (eg pulp & paper vs. wood products). These are facts of life to BC, but it will not pay to make facile assumptions about them while re-adjusting our internal allocation mechansims.

stable macro polices in Canada - ?

BCRC CONDITIONS

1. 50% BC annual volume target through standing timber and log market(s)

2. results would provide the basis for all public timber valuation for sale (market and non-market)

3. Province to be direct seller in at least part of market sales

The time target of one year is also derived from BCRC recommendations.

These conditions are difficult or impossible to meet under the methods proposed, or any that Nawitka can envisage at present.

MARKET DESIGN

The study acknowledges that it attempts to incorporate "desirable" aspects of other Regional systems (US South and PNW; Nordic countries).

Inevitably some questions of interpretation, and real experience in the workings of those systems (as opposed to a literature review, however well done) do arise. Nawitka is familiar with most of the forest sector analysts cited, and with a few industry participants in each of the cited regions. It is a fair statement that the industry participants often disagree with the analysts cited on important aspects of the workings of the forest sector in each Region.

The real differences between these areas and BC may also be treated inadequately - e.g. in other factor markets, in other government policies, in trading relationships.

However this problem is not as potentially serious as the one of attempting regional restructuring on the scale and schedule proposed.

Potential comments here far exceed the time available. The most significant potential problem which we foresee is in the creation of competitive timber sales of xx volume, equivalent to an appropriate supply volume, or even a marginal supply volume in each "market".

If THIS could be achieved, all the other cumbersome machinery might be redundant.

STEPS/TASKS TO SET UP A MARKET

1. Choose or establish a monitor & licencing agent (non-Mof)

2. Designate or establish Crown seller (Timber MoF/other)

3. Compose an industry working group to draft rules & procedures

4. Review, approve and appoint an initial (interim) Board, licence members and commence operations

5. award non-industry tenures structure final market organization board from successful biddrrs

6. appoint log and timber market committees (coast and interior)

7. open market for business

ACHIEVMENT OF OBJECTIVES

The ultimate measure of desirability of such a public policy action is achievment of the objectives, and (not unrelated) the ease of the transition period.

We (Nawitka) have serious reservations that a smooth transition is possible along the path proposed. More time (than one year) will be required, at a minimum.

We also have reservations about whether some of the underlying necessary conditions for establishment of effectively competitive markets for raw timber in Regions of BC, can be achieved under under the proposals.

If not, the chances of achieving the economic/welfare mix of objectives are significantly reduced.

June 30, 1992

G.C. van Kooten
6751 Azure Road
RICHMOND, British Columbia
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Mr. Derrick C. Curtis, Executive Director
B.C. Forest Resources Commission
700 - 747 Fort Street
VICTORIA, B.C.
V8V 1X4

Dear Mr. Curtis:

RE: Critique of Document entitled "Timber and Log Markets" by John de Wolf. Contract #141-89990

I have completed my review of the aforementioned document. I have enclosed

** (1) the original manuscript with my comments written in the margins;
(2) a copy of my written comments;
(3) signed copies of the contract and amendment; and
(4) a bill for my services.

In this letter, I want to make a few comments on style and content. First, unless one has had the benefit of reading the earlier version of de Wolf's report, it would not be entirely clear as to what is exactly being proposed. For example, the role of the Crown selling agency, the origin of its timber, et cetera, are not specified and one must rely upon the earlier version for clarification. Second, while this version of the report is a vast improvement over the previous version (in term of writing style, organization, etc.), I still find it needs improvement. For example, the writing style is still too wordy, a title is missing, the quality of print and general appearance indicate a lack of professionalism, there remain a large number of grammatical errors, exhibits and references are missing (although I have been assured that the latter are underway), and there remains a general lack of cohesiveness to the report. Third, upon reading my comments on the earlier version of the document, I find that most of these comments have been ignored (e.g., my comment about units of measurement). Lastly, as I elaborate in the enclosed comments, I remain unconvinced by the author's arguments.

** Marginal comments were noted.

Given the great difference between the first and second documents, I am unsure as to how the author intends to unify the two "sections". I think this is a particular problem that will need to be addressed.

I hope my comments prove useful to the Commission, and I thank you for the opportunity to be of service.

Sincerely yours,

G.C. van Kooten, Ph.D.
Resource Economist

Enclosures:
1. Original draft of document sent to me with comments
2. Written comments/critique of document
3. Signed copy of contract and amendment
4. Billing for services

Comments Regarding Timber and Log Markets by John de Wolf

General Comments

This document is an improvement over the earlier version in terms of writing style, length and organization. Nonetheless, some grammatical improvements need to be made, a title page would be helpful, the print quality and appearance could be improved, and missing exhibits and references need to be included.

Upon reading through the document, however, I am disturbed by the magnitude of difference between it and the previous version. A cursory reading of the report indicates to the reader that the recommendations contained in the report are rather benign, namely, to replace the current Vancouver log market (VLM) with one controlled by the government as opposed to industry. While the reason for doing so is unclear, it appears that this is to make the market more competitive and to obtain information about prices. The means for replacing COFI's function of operating the VLM with a government agency is also unclear, but one gets the impression that licensing of brokers and requiring all trades to go through registered brokers is how it will be accomplished. But once the reader comes across the idea of a Crown Selling Agency the waters begin to muddy. It is at this point that one has to know about the proposals contained in the previous version of the report.

In particular, one needs to read the earlier version to understand the institutional arrangements that are actually being proposed. In this version, we are simply told that 1/2 of the AAC will be assigned to companies with processing facilities, 1/4 to those without, and 1/4 to the Crown. The concept of a Crown Selling Agency is not introduced until the final paragraphs and it is unclear, in this version, how the Selling Agency is separate from the B.C. Forest Service and the "market-oversight" agency. Is the idea to somehow amalgamate the two versions of the report into one?

Specific Comments

1. While there is nothing inherently wrong with the literature review, I wonder what purpose it serves. The author examines markets in Scandinavia, the U.S. South, the U.S. Pacific North West, and B.C. The conclusion is that, for the most part, log and timber markets in regions outside B.C. appear to be well-developed, and that they function rather well. The discussion on B.C. markets (the VLM on the Coast and informal agreements in Interior) indicates that these markets also appear to function well, particularly those in the Interior. The main problem, according to the author, is that not enough logs and timber are traded in these markets. But the literature review points out exactly why this is the case: too much of the forestland is owned by the Province. The Province, in turn, has not collected the rents (stumpage prices in the U.S. are 4X higher than in coastal B.C., p.29) and has allocated tenure over this land to a few, large and integrated forestry companies. (My own view is that there exists a social contract between the government, companies and unions to divide the rent, at the expense of the public.) Ergo, the literature review clearly indicates that the problem in B.C. is not poorly functioning log and timber markets, but, rather, existing tenure

arrangements (the existing social contract). It is amazing how such a literature review could subsequently be twisted to justify the need to fix up the log and timber markets. Fix up the tenure arrangements instead!! I'm sorry, no other conclusion follows logically from the discussion of the literature.

2. As noted above, one cannot determine what alternative institutions are being suggested without knowing the contents of the previous version of this report. In particular, in this version, we are simply told that 1/2 of the AAC will be assigned to companies with processing facilities, 1/4 to those without, and 1/4 to the Crown; but this implies that it is necessary to take away an existing property right that is currently owned by the integrated companies. How this is to be done is not stated, nor is there any discussion about compensation (see articles by Gaffney, by Tideman and by Friedman in the May, 1992 American Economic Review on this topic). Is the idea for the Crown to harvest and bring logs to market?

3. The current level of tenure and processing concentration (in B.C.'s regions) will result in buyer concentration in the proposed log and timber market. Rather than deal with the problem directly (change existing tenure arrangements or simply increase the stumpage fee to collect the full rent), ideas concerning the alleviation of market power in the U.S. South will somehow be implemented in B.C. However, I am not convinced that market power is a problem in the U.S. South for three reasons. (1) Market power needs to be determined on the basis of firms' decisions as to where they will locate pulp mills and sawmills. At the time before locating the mills, there is competition. It dissipates *at the local level* once the mills are all in place. (2) But, as mills get older and technological advances (e.g., in transportation) occur, competition returns. The best example of this is provided by the car manufacturing industry in the U.S. during the early to mid-1970s. (3) Finally, the extent of monopoly power is curbed by the fact that products are sold in international markets.

The point is that, even with the report's recommendations, it will be impossible to prevent firms from buying more than 35% of a seller's volume offerings (as recommended on p.48). Passing a law to do so will only result in delays (a buying firm waiting until the next offer) or cross-hauling (as buyers go to other regions to get what they need); these are added costs and will only reduce the international competitiveness of the B.C. forest sector.

4. Units of measurement are not consistent throughout the report. Sometimes metric measures (m^3) are used, at other times board feet are employed.

5. The author confuses econometric models of timber markets with actual timber markets. The econometric models are mathematical representations of how markets function and clear; they are not intended to be a description of "how markets function" (p.36). Actual markets consist of hundreds or thousands of individual trades, contracts and so on, most of which are never reported. Prices and quantities are difficult to discover and we often need to rely on statistical agencies to get this information because it is confidential.According to the report, the Interior markets are of this form and so is the VLM. Because the latter is operated by COFI and involves mainly big players does not necessarily imply it does not function well and that government can do a better job. Remember the axiom: in addition to showing that government intervention in a market is

justified, it must also be demonstrated that the benefits of such intervention outweigh the costs.

6. The author argues for a self-regulated that is regulated by government; this is surely an oxymoron.

7. The authors suggests that there are two options for log and timber markets.

> "One method is a market organized by the industry on behalf of all participants in the market. The other is a market [a] organized by, or [b] operating under the laws or regulation of, the state" (p.46)

The choices [a] and [b] in the quote are not the same, although the author thinks they are. Indeed, it is an error to use the quote by Coase (p.46) to justify government organization. Rather, this quote supports my contention (above) that we need to get the tenure arrangements and rules of the game straight if we want markets to function in such a way as to maximize the welfare of B.C. residents. What are the legal rules? They are precisely the tenure arrangements that currently exist. Changing those rules adds to uncertainty and causes the B.C. forest sector to lose competitiveness vis a vis other countries.

8. On p.45, you had better make it three reviewers who are opposed to the idea of creating a new layer of bureaucracy (a government administered log and timber market) to current institutions. I think this fails to correct any real or apparent ills in the way timber is produced in B.C. and could result in added losses to society.

Conclusions

While this version of the report is greatly improved over the earlier version, there remain inconsistencies and errors of omission that provide cause for concern. The arguments in the report do nothing to convince readers of the need for the changes suggested. Indeed, the only policy recommendation that logically follows is that B.C. must consider means of privatizing large tracts of forestlands. If this is objectionable, then alternative tenure arrangements must be considered. One of these is simply to raise stumpage fees fourfold.

IMPACT OF THE BRITISH COLUMBIA FOREST RESOURCES COMMISSION'S RECOMMENDATIONS ON THE STRUCTURE AND PRODUCT MIX OF THE SOLID WOOD PRODUCTS SECTOR

Prepared for the British Columbia Forest Resources Commission

by

David Haley Ph.D., R.P.F.

and

Jeanette Leitch B.Sc., M.Sc., M.A.

Vancouver, British Columbia

January, 1992

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IMPACT OF THE BRITISH COLUMBIA FOREST RESOURCES COMMISSION'S RECOMMENDATIONS ON THE STRUCTURE AND PRODUCT MIX OF THE SOLID WOOD PRODUCTS SECTOR

EXECUTIVE SUMMARY

- The objective of this study is to examine the implications of the British Columbia Forest Resources Commission's recommendations on timber resource allocation for the structure and product mix of the provincial solid wood products sector, with particular emphasis on further manufactured (commonly referred to as *value added*) wood products.

- Sources of information upon which the analysis is based include published and unpublished documents and in depth interviews with a number of individuals and groups representing a broad spectrum of the wood products industry.

- Further manufacturing is defined as "all ways in which the value of output of the wood products sector can be increased". This definition includes operations taking place in logging, primary processing, lumber remanufacturing and secondary processing.

- The institutional environment in which the wood products industry operated between the late 1970s and the present is described with particular emphasis on public policies designed to allocate the timber resource between competing industrial uses. It is suggested that public objectives for British Columbia's

forest industries include: economic efficiency; higher value added; and increased employment opportunities.

- The evolution of the British Columbia solid wood products sector is described for the Coast and Interior of the Province and historical trends in shipments, prices, number of mills, average mill size, employment, productivity and product mix are analyzed. The development of the further manufacturing sector during the 1980s is documented.

- The present structure of the industry, with respect to the allocation of the AAC, is presented in tabular form and the impact on these allocations of the Forestry Resource Commission's recommendations are analyzed.

- A simple analytical framework within which to examine public goals for the forest industries is developed. Value added, profit margin, and economic rent, or stumpage, are defined. It is pointed out that policies designed to maximize the value of the timber resource (maximum economic efficiency) do not necessarily maximize the value added in timber processing nor satisfy public employment objectives. Firms pursue maximum profits. They choose that combination of outputs (i.e., their product mix), inputs (raw materials, energy, labour and capital) and processing technology which, they believe, will maximize their profit margins. The highest profit margins do not necessarily equate with maximum product values or the highest value added.

- Within the analytical framework developed, the relationships between timber allocation, industry structure and product mix are examined. This section of the study relies heavily on personal interviews conducted throughout the

Province. The Interior and Coast are dealt with separately. The factors considered include: products and markets; the cost and availability of labour and capital; access to appropriate technology; and access to timber.

- It is concluded that:

    - the creation of competitive timber markets would reshape the structure of the forest industry. However, it is likely that these changes would be incompatible with public objectives for the industry. The net result would probably be a more concentrated primary processing sector in the Interior and relatively smaller independent sawmilling and further manufacturing sectors. The costs in terms of industrial dislocation, reduced employment opportunities and community stability could be major. In contrast, on the Coast, under certain conditions, concentration in control over primary breakdown capacity might be reduced and the proportion of small to medium sized sawmills increased. The changes would have little impact on the independent remanufacturing and secondary processing sectors.

    - Timber availability is an oversimplification of the many factors affecting the establishment and growth potential of smaller scale, regionally owned and operated manufacturing plants. More pressing problems are markets, labour costs and access to capital. With the possible exception of independent primary processors on the Coast, it is doubtful that more competitive timber markets would help this segment of the industry.

- Relatively low, administratively determined stumpage prices "do not drive the solid wood industry towards the manufacture of lower value commodity products". The major force driving a firm towards a certain product mix is the desire to maximize profits. A firm's choice of outputs depends on product values and *all* the costs associated with manufacturing and delivering them to market. There is no reason to believe that competitive markets for timber will result in a higher percentage of further manufactured products in the product mix. *Adding value also means adding cost* and will only be pursued if such a strategy improves net returns and, thus, enhances a firm's ability to compete in the market place for timber and other inputs.

- Is recommended that:

  - Timber supply allocations to various industrial users and the structure of the forest industry should be dealt with in a coordinated manner in order to develop a comprehensive industrial strategy for the Province's forest products sector.

  - It be explicitly recognized that public goals for the forest industry - economic efficiency, higher value added, and increased employment opportunities - are not complementary and that methods be developed for evaluating the trade-offs and achieving a balance between them.

  - The timber supply and allocation requirements of a forest industrial strategy be coordinated with an overall land use strategy for the Province's forests.

OBJECTIVES

In 1976 the Pearse Royal Commission recognized the increasingly concentrated structure of the British Columbia forest industry, particularly with respect to timber harvesting rights, as detrimental to provincial interests. These interests include both the maximization of returns to the province from the utilization of the resource, in the form of stumpage payments, and maintaining the vitality of an export based industry operating in an increasingly competitive global economy.

The 1991 report of the British Columbia Forest Resources Commission echoes these concerns. The Commissioners see the creation of competitive timber markets as a key strategy in reshaping the structure of the forest industry. Such changes, they believe, would ensure that direct returns to the people of the province from resource use would be maximized. Furthermore, they suggest that competitive markets would favour a more diverse, less concentrated industrial structure by removing an important barrier to entry - access to wood supply. This barrier they were told "killed many innovative value added manufacturing proposals before they got off the ground". They believe that by creating a level playing field of equal conditions of access for all through markets for wood, there will be some assurance that wood will be put to its most efficient use and, further, that more raw material will be diverted into the manufacturing of higher value products. The Commissioners see these developments as contributing to their vision of a new, more diverse forest industry which would place added emphasis on local participation in both forest management and manufacturing, increase employment per unit volume of wood used and contribute to regional stability.

The general objective of this study is to examine the Forest Resources Commission's hypotheses in the context of recent changes in the structure and product mix of the solid wood products sector in British Columbia and advise the Commissioners on whether, in the opinion of the contractors, their recommendations on the methods of timber resource allocation would realize the desired goals.

More specifically the study objectives are:

- To examine recent changes in the structure of the forest (wood based) industry and the mix of products it produces to identify any evidence which will support the hypothesis that ***the creation of competitive timber markets is a key to reshaping the structure of the forest industry***.

- To determine whether an open log market would solve the problem of timber availability given the hypothesis that ***a major barrier to the establishment of smaller scale, regionally owned and operated manufacturing plants is timber availability***.

- Given the hypothesis that ***relatively low administratively determined stumpage prices have an impact on the industry's product mix, pushing it towards lower value commodity products***, to determine whether a freely competitive timber market will result in a higher percentage of further manufactured forest products in the product mix and, moreover, that plants producing such products will be more labour intensive (i.e., more person hours used per unit of raw material) than at present.

- To draw conclusions about the possible reasons for the changing product composition of British Columbia's wood industry (if indeed such changes can be demonstrated), paying particular attention to the impact of policy changes affecting raw material prices and access to raw material.

- To discuss implications of the project's results on future policy directions.

METHODOLOGY and DATA SOURCES

This study is concerned with the reasons why manufacturers in the solid wood products sector choose to market their output at a certain stage in processing rather than continuing to add further value to their products before they finally enter the market place. Of interest also is the technology chosen for the conversion processes in terms of size of production unit and degree of labour intensity. The particular focus is the role of timber allocation policy in influencing the product mix and production technology.

Our methodology has focussed on gaining an understanding of the determinants of the value of the industry's product mix and the structure of the industry in terms of firm scale and amount of employment. This knowledge was used to analyze policy initiatives designed to modify the mix of products in ways which will augment their value and to increase the participation of smaller scale, more labour intensive manufacturers.

The remaining sections of the report follow this general approach. First, a definition of the further manufactured or value added wood sector is presented. This is followed by an examination of relevant public policies. Next, information has been gathered and synthesized in order to estimate the current size, value and product mix of the industry, and to provide comparative data from which historical trends can be discerned. The sources of data for these parts of the report are the published and unpublished sources listed in Appendix One. It should be noted that the most recent and most comprehensive directory of the B.C. wood products value added sector only became available in the final days of the study (McWilliams 1991).

Next, an analytical framework has been developed within which to analyze the factors affecting the structure and product mix of the solid wood processing sector. This is followed by an analysis of these questions based upon data collected directly from those involved in the industry. Given the time and resources allocated to this study, it was impossible to carry out a comprehensive statistical survey of the wood products industry. Instead, we conducted a limited number of in-depth interviews with groups and individuals directly concerned with the production of further manufactured wood products. Those interviewed reflect the broad spectrum of the industry, including primary sawmills, lumber remanufacturers and manufacturers of secondary wood products and ranged from individual owner/managers of small private firms to representatives of major integrated companies. In order to economize on our time and, also, to get more representative viewpoints, we met with groups representing various industry associations including the *B.C. Wood Specialties Group* (BCWSG), *the Interior Lumber Manufacturers Association* (ILMA), the *Independent Lumber Remanufacturers Association* (ILRA), the *Interior Value Added Wood Association* (IVAWA) and the *Interior Category 2 Wood Processors Association*. A complete list of interviewees, together with a brief description of the firms represented by the individuals interviewed, can be found in Appendix Two.

In the next section, conclusions are drawn concerning the impacts of the Forest Resources Commission's recommendations for changes in timber allocation procedures on the structure and product mix of the solid wood products sector. Finally, recommendations are offered on how suggested policy initiatives might be modified.

DEFINITION OF FURTHER MANUFACTURED WOOD PRODUCTS

By further manufactured wood products we mean all ways in which the value of the output of the wood products sector can be increased. Crafted musical instruments, quality furniture and fine manifestations of the wood carver's art come to mind as high value products, but these are at the highest end of a spectrum of further manufactured products. A useful definition of adding value as any "economic activity where the output value is higher than the input value" comes from McWilliams (1991).

It is important, therefore, to embrace all phases of the solid wood products industry. This approach is a departure from the definitions used in some studies which suggest that further manufacturing, or increasing value added, implies the production of processed lumber products beyond the *primary stage* using different types of manufacturing facilities and, generally, targeting a different set of customers. McWilliams (1991) limits his definition of the value added sector to secondary wood products manufacturers for the purpose of compiling a directory but notes: "In the wood products sector of the B.C. forest industry, primary producers as well as secondary producers add value to their raw material." We would expand McWilliams' definition further to suggest that the process of adding value starts in the woods.

While, for convenience, the process of adding value to wood is divided into individual stages, it is, in fact, a continuum which starts with standing trees and is open ended as far as the nature of the product sold to the final consumer is concerned. Here we identify four major stages in the solid wood processing sector, each one concerned with adding value to the raw material.

- **Logging**: in which standing trees are felled and converted into logs. The difference in value between the standing trees and the logs is the value added in logging, and this will depend in part on the skill and care with which the trees are felled and the logs made. The unit value of the logs produced depends upon the demand for logs. Further value can be added to the logs in the course of delivery to their user depending on how the logs are bucked, dressed and sorted. Adding maximum value at this stage involves knowledge of consumer preferences as expressed in willingness to pay.

- **Primary Processing**: in which logs are manufactured into lumber - or solid wood pieces of rectangular cross section. Lumber is not a homogeneous product and within this sector there are myriad opportunities for adding further value to the raw material including sorting by species; defect removal; trimming; cutting special sizes to meet customer's requirements; sorting for grade (clears, shop, dimension etc); mechanical stress grading; drying; and planing. Even generic commodity products can have value added to them by differentiating them into brand name products through packaging. Value can also be added through services which meet customer specific requirements.

While McWilliams (1991) notes that primary processors add value, he limits the definition of the value added sector to processing beyond primary breakdown and includes sawmill specialty products as a subgroup of remanufactured products. The report notes, however, that: "sawmill companies in B.C. probably have the greatest opportunity to make more value-added products because of their control of log supply, access to market information and financial strength". The potential of primary processors to add value is discussed by Cohen (1992).

The division between primary processing and remanufacturing is frequently blurred, partly because some processes can be carried out either at the site of primary processing or in a different facility. Some examples would be kiln drying and planing which can be carried out by a primary processor or as a separate operation by a different firm, in which case, it would be considered remanufacturing. Other examples would be selection or further sawing to produce special select, shop and clear grades of lumber, or ripping to produce boards.

- **Lumber Remanufacturing**: in which lumber as a raw material is converted into higher value products as a separate operation and, frequently, in a separate plant. This sector produces a broad range of merchandise including edge glued lumber; panelling; siding; flooring; patterned stock; moulding; shelving; furniture blanks; window blanks. We would also include finger jointed lumber and machine stress rated lumber (MSR) though these are classified by McWilliams (1991) as commodity products. They do, however, involve additional costs in their production and command a premium in the market reflective of the added input costs. An important sub-sector of lumber remanufacturing in British Columbia is the cedar specialty industry which, as the name implies, produces a broad range of products exclusively from western red cedar.

- **Secondary Processing**: in which lumber, or remanufactured lumber products, are used to produce finished, consumer products. In this section we include various product groups which are separately categorized in McWilliam's classification of the secondary industry in B.C. The justification for this is found in the summary matrix provided by McWilliams in which he indicates that the remanufactured products sector is the largest sector by all the measures used: employment, wood consumption, export sales and revenue generated. Thus we are defining the secondary processing sector to include all those products classified by McWilliams in the following groups: engineered building components; millwork; cabinets; furniture; pallets and containers; other wood products. These include such individual items as doors; windows; roof trusses; ready-to-assemble furniture or furniture components; cabinets; log homes; treated wood; custom joinery; turned wood products; chopsticks; ladders and boxes.

POLICY OBJECTIVES AND IMPLEMENTATION

Society receives a variety of important benefits from the processing of timber resources. Through ownership of the forest resource the government of British Columbia has the opportunity to influence the benefits associated with the exploitation of its timber values. These benefits can be categorized under three main headings as:

- the wealth created in the form of the value added to timber in the course of processing activities;
- the revenue accruing to the government, on behalf of the public owners of the resource, as economic rent generated through the sale of public timber to processors;
- the jobs created in the timber processing sector, associated communities, and dependent industries.

The main instrument available to the Ministry of Forests to use in pursuit of these objectives is timber allocation policy. However, other branches of government at local, provincial and federal levels also have roles to play in that they have other means of influencing the development of the timber processing industry. This section describes the institutional environment in which the industry operated between the late 70s and the present with respect to the strategies implemented by the Ministry of Forests in pursuit of these objectives and their impact on the industry.

The 1976 Royal Commission on *Timber Rights and Forest Policy in British Columbia* (the Pearse Commission) stated that timber allocation policies appeared to have promoted large integrated firms at the expense of small independent operators. It was also suggested that efficiency in resource allocation, including maximum return to resource owners (highest stumpage price), which is associated with competitive markets had become secondary to other objectives.

These observations have been interpreted as implying that a different allocation policy would lead to a different processing industry: and, in particular, that a more competitive timber allocation policy would lead to a wood manufacturing sector which would provide, more effectively, the multi-faceted benefits society can receive from processing the resource. These ideas can be expressed as a hypothesis which involves the following chain of reasoning:

- Competition allocates timber to the highest bidder, which ensures that the province receives the highest benefit possible in the form of stumpage revenue.
- Economic theory tells us that this highest bidder is the one who will use the resource most efficiently, therefore, competition also ensures that the timber resource is allocated to its best use.
- Since large integrated firms exist under the present, biased, non-competitive allocation system, they exist because of that system and in an open market on a fair and level playing field would be outperformed to some extent by more efficient smaller firms.

The argument continues with an interpretation of *most efficient use* and *best use*. From the perspective of society, the best uses are those which best provide benefits in the form of stable and full employment and maximize the creation of wealth. Thus, the hypothesis proceeds with the following reasoning:

- The more efficiently the resource is used, the more valuable the end product manufactured and, thus, the greater the wealth created. Thus greater efficiency in resource use results in the production of more highly valued goods.
- Furthermore, since more valuable end products require a higher degree of processing, employment will also increase.

New policy was initiated following the Pearse Commission to specifically address the questions of industry structure and maximization of stumpage revenue. Special timber sales, which were designated for small businesses and were to be sold competitively, were introduced. Under this programme, which became effective in 1980, registrants in one of two categories - Category 1 (loggers who do not own or lease a timber processing facility) and Category 2 (timber processors who do not hold other rights to harvest Crown timber) - were given the right to bid on Crown timber specifically allocated to the programme.

The immediate goal was to make timber available specifically for small businesses to the exclusion of large integrated firms. Thus, the perceived bias of the existing allocation system towards large firms was offset by a programme biased toward smaller firms. These small, non-renewable sales were offered on a competitive basis to address the objectives of efficiency in resource use and maximization of stumpage revenue.

The programme was a success in terms of the interest it mustered among small firms and the additional stumpage revenues it generated for the Crown. It was considered less successful, however, as a means of promoting the entry to the industry of small firms manufacturing more highly manufactured products. To Category 1 bidders, the drive for greater efficiency consisted of either exporting logs or selling them to larger integrated firms. A link between successful Category 2 bidders, mainly located in the Interior, and the lumber remanufacturing and secondary processing industry was never firmly established.

The latter objective, however, was becoming increasingly important as the potential for increasing total value and total employment simply by increasing total volume was being sharply curtailed. The Ministry of Forests' *Forest and Range Resource Analysis* of 1980 set the provincial AAC at 75 million cubic metres and forecast future reductions in permissible harvesting levels. This brought home to the government the fact that the days in which expanding harvests could be relied upon to promote economic growth and increasing employment opportunities were over. With the provincial AAC almost totally committed to existing timber processing capacity, it was apparent that growth, or even maintenance, of the wealth generated by a fixed or declining timber base could only be achieved by increasing the value added in manufacturing through the production of products of higher market value.

A number of government sponsored inquiries were carried out during the 1980s to provide further information on the secondary wood products industry and to provide advice on strategies designed to restructure the solid wood products sector in ways which would encourage the production of a higher value mix of products. In 1984, such a study was carried out as part of the British Columbia Ministry of Forest's Resource Analysis, by Woodbridge, Reed and Associates. In 1986, Forintek Canada completed a study of *Technological Needs in Lumber Remanufacturing*. In 1988, a major investigation into *A Value Strategy for B. C. Solid Wood Products* was prepared by Deloitte Haskins and Sells with Carroll-Hatch Ltd for the Canadian Department of Regional Economic Expansion and the British Columbia Ministry of Regional

Development. The same year, Woodbridge, Reed and Associates produced another study on *The Status and Direction of the Lumber Remanufacturing Sector in British Columbia* for the Canadian Forestry Service under the Federal-Provincial Forest Resource Development Agreement (FRDA). Under FRDA II a directory and report entitled the *Profile of the B.C. Wood Products Value Added Sector*, referred to earlier as McWilliams (1991), has just been completed.

In September 1987, the Minister of Forests and Lands announced a "new direction for forest policy" in British Columbia. One of the initiatives proclaimed was designed to:

> "encourage a competitive and more diversified industry in British Columbia. Programme modifications will stimulate additional processing, developments in secondary and tertiary solid wood products manufacturing and increased utilization of residual and specialty wood resources."

Under the programme, given statutory force in July 1988, 5 per cent of the AAC held under licence, mainly by the major companies, was diverted to the independent remanufacturing and secondary processing industry. The notion that under true competitive conditions such enterprises could flourish was not abandoned, but this pro-active policy was perceived as a mechanism to ameliorate the impact of the existing industry structure and allocation mechanisms on smaller, further manufacturing firms. This new programme is variously referred to as "bid proposal sales" or 16.1 sales, after the section of the Forest Act which provides its legislative authority. Under the programme, sales are not necessarily awarded to the firm willing to pay the highest price but, rather, to the firm which can most successfully meet a number of criteria prescribed by the Ministry of Forests, the most important of which is the amount of value which will be added as a result of the manufacturing process.

The bid proposal sales and the competitive small business sales, authorized under the initial section 16 of the Forest Act, are collectively known as the *Small Business Forest Enterprise Program* (SBFEP). According to the Ministry of Forests, the objectives of this programme are threefold:

- to provide **new opportunities** for individuals and firms to enter the forest industry and establish businesses;
- to encourage **diversification** within the forest products industry and increase employment; and
- to ensure, through competition, that the most efficient firms are awarded timber sales and the province receives a fair rate of return for the forest resource.

The programme has been the subject of various reviews (for example Gillespie (1991)) and there is currently a survey being conducted to determine the present status of the projects of those who have received bid proposal sales.

The British Columbia Forest Resources Commission (FRC), which was established to independently review and report to the Government on forestry issues, made its first report public in April 1991. In this report it reiterated the observations made by the Pearse Royal Commission of 1976 concerning concentration of control over the forest resources of British Columbia. With respect to the timber processing industry the FRC considered that:

> "The degree of corporate concentration in tenure holdings raises greater concern than the degree of corporate concentration in manufacturing facilities." p. 36.

And, concerning objectives for the processing industry, it was concluded that:

> "the wood processing industry must be allowed to evolve into whatever structure is needed to maintain its ability to compete in world markets."
> p. 59

This objective parallels the mandate of the British Columbia Forest Service as provided in the *Ministry of Forests Act*, that is :

> "4(d) encourage a vigorous, efficient and world competitive timber processing industry in the Province."

The Commissioners recommended the establishment of a competitive market for wood to ensure the Province receives the highest value for timber. This was also seen as a means of promoting other provincial objectives for the timber processing industry. They suggested that a more competitive timber allocation system will result in higher stumpage revenue from more efficient use of the resource, and that some of these more efficient users will be small firms who produce higher value products and employ more people.

Specifically, under the Commission's proposals, current holders of long term harvesting rights will be allowed to retain, in part, their exclusive access to Crown timber. The general rule would be that no company with manufacturing facilities would be allowed to hold Crown tenures to harvesting rights in excess of 50 percent of the lesser of either their processing capacity or their present cut allocation (recommendations 57 and 58 of the Commission's report). However, existing Tree Farm Licences would be "grandfathered" in that, as part of the conversion process to the proposed new tenure system, they would not be reduced in either area or volume, except when change of ownership occurs. The Commission also recommended that the Category 1 and 2 sales under the SBFEP be phased out (recommendation 68), but that Section 16.1 sales under the SBFEP be converted to area-based Resource Management Agreements where possible (recommendation 69).

These recommendations lead directly to the purpose of this study which is to examine the likely effects of the allocation policies recommended by the FRC with respect to society's objectives and expectations for the industry, with particular emphasis on the production of more highly manufactured wood products. In the following section, the history of British Columbia's solid wood products industry is described. An analytical framework is then developed within which this problem can be addressed.

INDUSTRY PROFILE and HISTORICAL PERSPECTIVE

In 1990, shipments of BC lumber totalled 14.0 billion fbm, with a value estimated to be $5 billion. The total sales revenue of the secondary wood processing sector in 1990 was estimated by McWilliams (1991) as $1.5 billion, of which the share from the remanufactured products group was $710 million. The lumber consumed in the generation of this revenue was estimated as 1.5 billion fbm for the sector as a whole, of which 1.2 billion fbm was used by lumber remanufacturers. Thus, the unit revenue for remanufacturers was almost $600 per thousand fbm compared to $360 per thousand fbm for all lumber shipments, and $217 per thousand fbm for SPF dimension lumber.

The 1.5 billion fbm consumed by the secondary wood processing sector represented 60% of shipments of B.C. lumber within B.C., 40% of shipments to all Canada, and 11% of the total shipments of lumber. The output of this sector was produced in 565 establishments, of which 150 were remanufacturing plants, by approximately 12000 employees, of whom 3500 worked in remanufacturing. The numbers of establishments and employees in the sawmill sector are not available yet for 1990, but comparable figures for 1988 were 333 mills with 30696 employees.

The rest of this section describes the evolution of the British Columbia wood products sector and traces historical trends. This description differentiates between the industries of the Coast and the Interior of the Province. This is essential because the characteristics of the raw material base, the product mix, the markets served, the manufacturing technology used and the historical development of the industry differ significantly between these two regions. These regional histories concentrate on the primary processing sector. In a third part, the secondary wood products sector is discussed for the province as a whole because there is not sufficient historical data to discuss Coast and Interior separately.

THE COAST INDUSTRY

For a century, from its inception in the mid-nineteenth century until the 1950s, the lumber industry of the British Columbia Coast produced a wide spectrum of products ranging from select lumber grades of varying lengths and cross sectional dimensions to board products and more highly manufactured speciality items such as door and window stock, mouldings and clear Douglas-fir flooring. Through the growth of both domestic and export markets, the Coast industry soon became a mainstay of the provincial economy. The principal species used was Douglas-fir but some cedar products were produced and, latterly, hemlock-balsam. The huge size of the logs processed was reflected in mill outputs that were orders of magnitude greater than the Canadian average.

During the 1950s, however, things began to change. The rapid growth of the Coast Douglas-fir plywood industry in the years immediately following the second world war deprived the lumber industry of the highest quality clear logs. During this period, also, many of the remaining independent owner-managed sawmills disappeared and lumber capacity and control over timber rights became increasingly concentrated in the hands of a smaller number of fully integrated corporations.

During the 1960s, a number of factors came together simultaneously. The available harvest from the Coast, which had fluctuated about 15 million m^3 throughout the 1940s and 1950s, approximately doubled in the space of a single decade, to reach 30 million m^3, a level about which it has fluctuated, fairly wildly at times, in the 20 years since (Figure One) (Figures can be found at the end of this section pages 34 to

38). This was partly due to recalculation of available AAC and partly due to increased utilization standards. Concurrently, the import demand for construction grade dimension lumber in the United States market rapidly increased and the industry of the British Columbia Coast found that it could compete well with its green, random length, dimension lumber in the lucrative market of the eastern seaboard of the United States.

These demand and supply factors translated into an increase in lumber production from a level of about 2.5 billion fbm through the 1950s to 4.2 billion fbm in 1973 (Figure Three). In addition, average mill size, which had been slowly growing, increased sharply, as measured by annual shipments, from about 10 million fbm in the late 1950s to over 40 million fbm in the early 1970s (Figure Seven). The increase in total production did not compensate for the increased mill size and the number of sawmills continued a decline that had already started in 1950 (Figure Six).

The increased average size of plants was no longer associated simply with large logs, but reflected a switch in emphasis from quality, or value of output, to volume. Gangsaws, which are designed to produce standard dimensions, made their appearance in Coast sawmills and soon became commonplace.

The increased emphasis on volume was reflected in the increasing proportion of commodity dimension lumber produced by the industry. By the late 1970s, about 50 percent of Coast sawmill production was being shipped in dimension grades. To some extent, increasing capital intensity and economies of scale were accompanied by labour productivity increases which occurred during the early 1960s. From the mid-1960s to the early 1980s, however, average labour productivity remained approximately constant in Coast sawmills (Figure Eight).

In contrast to the Interior, which continued to show increases in labour productivity and economies of scale into the 1970s, the coast mills did not show the same improvements in efficiency in that period and gradually became less able to compete in the dimension lumber markets of the U.S., especially given the growing supply from the U.S. south. In addition, average quality of the Coastal log supply was gradually diminishing with the disappearance of the stands of huge Douglas-fir on the eastern side of Vancouver Island. Nevertheless, 1978 and 1979 represented record years for lumber shipments from the Coast in terms of both value (Figure Four) and volume (Figure Three). This was mainly due to a peak in demand as can be seen from the fact that prices were also at record highs at that time (Figure Five).

In 1981, the lumber industry entered a prolonged recessionary period. United States housing starts declined sharply and prices fell steadily from peak levels in 1979 while the cost of capital soared. By 1982, many analysts were referring to the Coast lumber sector as a "sunset industry".

The industry faced a dilemma. As the Coastal AAC had already reached its maximum, there was a constraint on wood supply and thus total value of shipments was not likely to grow through volume increases, however efficient the mills. Furthermore, many of the existing mills were old with obsolete equipment incapable of dealing efficiently with an increasing proportion of logs of both smaller size and declining quality. Furthermore, markets had to be diversified to reduce dependence on the United States construction industry.

The only way to increase profit margins without increasing the value of the output mix would be to pay less for inputs such as raw material or labour. The reality was rising wood costs, relatively high fixed capital costs and labour rates which were inflexible downwards, each acting to force down profit margins. The only possible solution lay in product diversification designed to process end products of higher value, provided this could be done at an added cost less than the additional revenue. It was clear to most firms that the answer lay in restructuring to produce products of higher value destined for overseas markets in Europe and Japan.

The wisdom of this strategy was supported by market trends. For example, the price of clear lumber, which had risen steadily relative to other grades during the 1970s, took off in the mid-1980s at an accelerated rate (Figure Ten). The supply of high quality old-growth logs in the United States Pacific Northwest, which had been largely depleted on private industrial lands, was being further reduced by land withdrawals to meet environmental objectives on U.S. National Forests and increasing scarcity was forecast. Also, the reduction of the California redwood supply, due to logging and forest land withdrawals for other uses, increased opportunities to develop red cedar as an appearance wood.

Throughout the latter part of the 1980s, the coast industry, through investment, reorganization and market development, continued to increase the unit value of its shipments to offshore markets. This is reflected in Figure Five in the rising trend of unit values of Coastal lumber shipments since 1985 as compared to the Interior. It is also illustrated in Figures Eleven, Twelve and Thirteen, which show, respectively, the premium prices for shipments offshore compared to exports to the U.S. and the increasing trend in volume and value of offshore lumber exports from B.C. Although volume and value data by region of origin were not available, offshore exports come largely from the Coast. This increase in the unit value of shipments was accomplished by the major companies through the recovery and marketing of higher proportions of shop and clear lumber grades and producing a wide spectrum of sizes to meet customer needs as described by Cohen (1991). The premium for grade is illustrated in Figure Ten. Some major companies developed the capacity to produce joinery sizes and grades, specialty remanufactured products and secondary wood products. The industry has increased its efforts aimed at expanding offshore markets and has become involved in cooperative endeavours. As can be seen from Figure Eight, the coast industry has also increased labour productivity during the 1980s rather than labour intensity.

The present structure of the Coast industry, with respect to the allocation of the AAC, is summarized in Table One.

Table One

Allocation of Allowable Annual Cut: British Columbia Coast

No.of Firms	Firm Type	Committed AAC	Timber Req.	Firm AAC Firm Req.	Firm AAC Coast AAC	Firm Req. Coast Req.	Firm Req. Coast AAC
		Thousand Cubic Metres		%	%	%	%
A. Situation in 1991							
5	Pulp	17059	13925	122.5	68	52	56
2	Large Lumber	3086	4085	75.5	12	15	16
4	Small Lumber	512	1948	26.3	2	7	8
21	No Tenure	0	4291	0	0	16	17
	Other[1]	4400	2700	-	18	10	11
	Coast Total	25000	27000	-	100	100	108
B. Situation After Implementation of Commission's Recommendations[2]							
5	Pulp	13417	13925	96	54	52	56
2	Large Lumber	1543	4085	38	6	15	16
4	Small Lumber	256	1958	13	1	7	8
21	No Tenure	0	4291	0	0	16	17
	Other[1]	10000	2700	-	40	10	11
	Coast Total	25000	27000	-	100	100	108

1/ Excludes log exports and pulp mill whole log requirements.

2/ Assuming no other changes

Source: Derived from FRC Background Papers Volume 5 (Nawitka 1991)

Pulp mill wood requirements have not been included in the table. Since many Coastal pulp mills consume raw logs, the excess of AAC over timber requirements attributed to these firms would be altered if their pulp log requirements were included. Another demand on Coastal timber is the log export trade. These two factors increase considerably the gap between timber requirements for all Coastal solid wood processing facilities and available AAC. The heterogeneity of Coastal logs with respect to species, sizes and grades provides an incentive for sorting and also trading. Cedar, particularly, has different processing requirements than other species. Log sorting allows specialist producers the potential to compete. However, both the timber requirements of mills operated by major, integrated firms, and the appurtenancy conditions of licences, have resulted in log exchanges rather than log sales.

There are only two firms on the Coast without pulp capacity which have primary breakdown capacity comparable in volume to those with pulp mills, and one of these would be classified, on a province-wide basis, as an integrated firm since it has Interior pulp capacity. Exclusive of the one large lumber firm, there is more capacity in the remaining primary breakdown sector owned by those with no major tenures than by those holding timber rights, which in any case average barely 25 per cent of their timber requirements.

Table One also shows the distribution of the coastal AAC as it would be after implementation of the Commission's recommendations for reallocation of the AAC, assuming other factors remained unchanged. Because of the high proportion of TFL timber among Coastal pulp firms, none of these firms would be reduced below 50 per cent of requirements. The two large lumber firms would drop to considerably below 50% of their requirements. The share of AAC not committed to major integrated or unintegrated processors would approximately double to 40 per cent.

THE INTERIOR INDUSTRY

The Coast lumber industry was well established by the 1950s when the Interior industry was just embarking on a path of continuous expansion that has marked its development throughout the following four decades. Prior to the 1950s the Interior lumber industry was comprised of over a thousand mills, many of them very small portable units, producing a variety of lumber products for export, domestic and local markets. On average, each mill shipped less that a million fbm per annum.

In the early 1950s the number of Interior mills was still growing. It reached a peak in the middle of the decade, then started on a steep decline reflecting the rapid changes the industry was undergoing. In the course of 15 years, the number of mills diminished from 1575 in 1955 to 300 in 1970 (Figure Six), while total shipments doubled from 2 billion fbm to 4 billion fbm (Figure Three). Thus, average mill size increased tenfold during this period from 1.3 million fbm to over 13 million fbm (Figure Seven). Concurrently, the number of workers employed stayed relatively constant at approximately 13000. Taken in conjunction with the increase in shipments this can be interpreted either as a doubling of labour productivity from 160 thousand fbm per employee in 1955 to 300 thousand fbm per employee in 1970 (Figure Eight), or a decline in the number of workers employed per thousand cubic metres of timber consumed from 1.3 in 1955 to 0.7 in 1970 (as can be derived from Figure Nine).

The major structural changes which the industry underwent were in response to the burgeoning demand for construction grade softwood dimension lumber in the United States. The changes were made possible by the increased timber volumes available in the Interior as reflected in the rapidly rising harvest levels depicted in Figure Two. Between 1950 and 1970 the Interior harvest grew fourfold from 6 million cubic metres to 26 million cubic metres. Furthermore, the changes were facilitated by public policy with respect to timber allocation and access provisions. Of particular importance was the introduction of the close-utilization policy in the early 1960s which allowed tenure holders to increase their AACs by one third if they agreed to utilize trees and logs to close utilization standards. In order to take advantage of this opportunity, mills had to have equipment capable of handling small logs efficiently - usually some kind of chipper head-rig and debarking facilities - and a contract for the sale of chips to a pulp mill. The ability to accommodate these increased capital requirements was facilitated by the tenure security provisions that evolved informally under the unofficial name "quota". The rise of these large capital intensive mills was accompanied by the demise of many small mills which were simply unable to compete against the high efficiency of the super-mills. Although the province did not see many gains from the increased efficiency in terms of higher stumpage fees, these gains did not accrue simply to capital but were split with labour through rising wages during this period. The overall result was a move towards greater concentration in sawmill production and integration between the sawmilling and pulp sectors.

Over the succeeding years, capital requirements in sawmilling continued to increase as the quest for profits and competitive advantage drove the industry towards mills of increasing capital intensity, employing the latest technology designed to improve recovery and increase linear throughput in order to lower unit production costs. Thus, average mill size in the Interior continued to rise dramatically, increasing by 16 million fbm in the period from 1970 to 1976, and by a further 16 million fbm after 1976 to reach 44 million fbm in 1985 (Figure Seven). This represented a scale factor of 30 times above 1955, compared to the fourfold increase on the Coast over the same period. It was only in the early 1980s that average mill size in the Interior actually overtook that on the Coast. Total shipments were still growing exponentially, increasing from the 4 billion fbm mark in 1970 to 10 billion fbm in 1985 (Figure Three).

However, the decrease in mill numbers slowed considerably during the 1970s and 1980s, averaging about 225 in the decade between 1975 and 1985 (Figure Six). Labour productivity doubled again in just 18 years, from 300 thousand fbm in 1970 to 600 thousand fbm in 1988 (Figure Eight).

The recession of 1981-82 had a major impact on the Interior, which is overwhelmingly dependent on United States housing markets. Shipment volumes fell from almost 8 billion fbm in 1979 to 6.6 billion fbm in 1982, and values from $2 billion in 1979 to $1.5 billion in 1982. In real terms the decrease in value was more drastic, falling from $1 billion to below $0.6 billion in constant 1971 dollars. However, recovery from the recession was rapid in the Interior and it was not followed by major industrial restructuring as was the case on the Coast. Shipments bounced back and, already, by 1983 their volume exceeded the previous high of 1979. By 1985 they surpassed the 10 billion fbm mark and have remained at approximately that level in the five years since. Demand peaked in 1987 bringing with it high prices, but although shipment volumes, at 11 billion fbm, were almost 40 per cent higher than the previous peak of 1979, shipment values in constant dollar terms fell just short of the 1979 record.

Thus during the 1980s the increasing volumes produced in the Interior were unable to compensate for the fall in real prices for SPF lumber associated with falling demand (Figure Five). In addition, following the 1980 *Forest and Range Resource Analysis*, a new reality had to be faced in the form of limits to harvest expansion.

The Interior industry has as yet made little progress in the restructuring that will be necessary, in contrast to the Coastal industry. This is not surprising given the nature of Interior timber resources which are more homogeneous than the Coast in terms of species composition and size and do not lend themselves as readily to the production of such a wide range of products and grades. Furthermore, the Interior industry was committed to relatively new, capital intensive, inflexible mills designed specifically to produce dimension lumber for the North American markets.

Although a number of the larger sawmills upgrade product value through sorting and some remanufacturing such as finger jointing, the production of remanufactured speciality products and secondary wood products in the Interior is mainly carried out by independent, generally small, manufacturers. One major company, West Fraser Mills Ltd. has established a secondary manufacturing facility - Quesnel Laminators - close to the company's sawmill site at Quesnel and at least two of the larger lumber producers are planning joint ventures in further manufacturing with smaller independent firms. Some Interior manufacturers are part of cooperative marketing endeavours, but overall there is far less activity in the value-added segment of the industry in the Interior than on the Coast.

Today, over 70 per cent of the volume but less than 60 per cent of the value of British Columbia's lumber shipments originate in the Interior (Figures Three and Four).

The present structure of the Interior industry is summarized in Table Two. In the case of the Interior the exclusion of pulp mill wood requirements does not have a significant impact on overall timber requirements since pulp mills there rely almost exclusively on by-product chips. There are, however, a few chip processing plants whose requirements are excluded from the overall total.

As can be seen from Table Two, there is a gap between timber requirements for all Interior wood processing plants and available AAC. This deficit is exacerbated by the nature of the sawmills classified by firm type as *integrated with pulp*, or *non-integrated but large*. These two groups, combined could consume all the available AAC and more. Their capacity has been calculated on the basis of two shifts a day but it is more economic for them to operate three shifts a day.

The economies of scale in Interior mills arise from the high ratio of fixed costs to variable costs. This means that once fixed costs are covered then the revenue from any additional output only has to cover variable costs. This is the mechanism which enables these large mills to pay much higher prices for logs provided by Category 1 loggers. Conversely, if fixed costs are not covered then these mills cannot afford to operate at all, they thus have a minimum appetite for logs, and if they are not fed this minimum they cannot survive.

In contrast, smaller producers have much greater flexibility both in the range of products they produce and the range of capacity over which they can operate profitably. They have a high ratio of variable costs to fixed costs. They cannot afford to pay a higher price for the inputs to increase their production level than they can for existing inputs. In the production of commodity dimension lumber such mills cannot compete with large scale, efficient mills, but, conversely they have an advantage in the production of more specialized lumber products. In contrast to the Coast, however, the premium for these specialized products has so far proved insufficient to allow these mills to compete for limited timber with the dimension mills.

Table Two also shows the distribution of AAC as it would be after the implementation of the Commission's recommendations. There is only one Interior firm holding a TFL with such a large volume that the grandfathering conditions affect the result.

Table Two

Allocation of the Allowable Annual Cut: British Columbia Interior

No.of Firms	Firm Type	Committed AAC	Timber Req.	Firm AAC / Firm Req.	Firm AAC / Inter AAC	Firm Req. / Inter Req.	Firm Req. / Inter AAC
		Thousand Cubic Metres		%	%	%	%
		A. Situation in 1991					
9	Pulp	24829	31634	79	51	60	65
19	Large Lumber	12423	17242	72	25	33	35
13	Small Lumber	928	1693	55	2	3	3
17	No Tenure[1]	0	1373	0	0	3	3
	Other[2]	11000	400	-	22	1	1
	Interior Total	49000	52300	-	100	100	107
		B. Situation After Implementation of the Commission's Recommendations[3]					
9	Pulp	12540	31634	40	26	60	65
19	Large Lumber	6212	17242	36	13	33	35
13	Small Lumber	464	1693	27	1	3	3
17	No Tenure	0	1373	0	0	3	3
	Other[2]	30000	400	-	61	1	1
	Interior Total	49000	52300		100	100	107

1/ Some category 2 processing plants are included here but some of these are committed entirely as they were not identified in the source.

2/ Excludes chip processing plant requirements

3/ Assuming no other changes.

Source: Derived from FRC Background Paper Volume 5. Nawitka (1991)

Since no interior firms start from an AAC position which exceeds capacity requirements, all firms would end up with less than 50% of their requirements, providing there were no other changes. Some integrated firms in the Interior would actually end up with considerably less than is shown here if the calculation was based on their Coast and Interior operations combined.

Development of the Further Manufacturing Industry

The further manufacturing industry is not well documented in terms of its size and structure and the available historical statistics are incomplete and frequently difficult to interpret. The industry is made up a of large number of small firms - 565 according to the most recent study. Each firm, on average, has 21 employees and annual sales of 2.6 million dollars (McWilliams 1991). The industry is highly competitive and there is a natural reluctance on the part of participants to share information. Only in fairly recent years have trade associations been formed, mainly to represent the industry's concerns in its dealings with both provincial and federal governments who have taken an increasing interest in the sector since the early 1980s. These include the *Independent Lumber Remanufacturers Association* (founded 1979); the *B.C. Wood Specialties Group* (founded 1989); the *Interior Value Added Wood Association* (founded 1991) and the *Interior Category 2 Wood Processors Association* (founded 1987).

Statistics Canada data on further wood manufacturing are published under several SIC 3-digit and 4-digit classifications within the major Wood Industries (SIC 25) group. However, this group does not include furniture manufacturers which are reported under Furniture and Fixture Industries (SIC 26). Wooden Household Furniture, for example, is SIC 2611. What has been referred to in our classification of the industry as lumber remanufacturing does not have a separate SIC number. Rather, this segment of the industry is included in several other categories.

Tables Three and Four provide a composite picture of the development of the further manufacturing industry from 1982 to 1991 using figures drawn from several sources. The remanufacturing segment of the industry appears to have expanded during this period. This growth was largely based on the development of export markets. Secondary manufacturing, which mainly serves domestic markets, does not appear to have followed the same upward trend.

Table Three

Estimated Size of the Lumber Remanufacturing Industry 1982 - 1991

Sources	Year	Number of Plants	Number of Employees	Shipments Value	Shipments Volume
				million $	million fbm
Woodbridge Reed (1984)	1982	75	1800	160	
Neilson (1986)	1986	63	1662		990
Ind.Sci and Tech. (1989)	1989	138			
McWilliams (1991)	1991	150	3470	710	

Table Four

Estimated Size of the Secondary Wood Processing Industry 1982 - 1991

Source	Year	Number of Plants	Number of Employees	Value of Shipments
				million $
Woodbridge Reed (1984)	1982	418	6180	455
Statistics Canada[1]	1984	525	6535	577
Statistics Canada[1]	1987	495	7568	
McWilliams(1991)	1991	415	8190	830

1/ Includes wafer board and particle board but excludes the furniture industries.

Figure One

Coast Harvest Volume

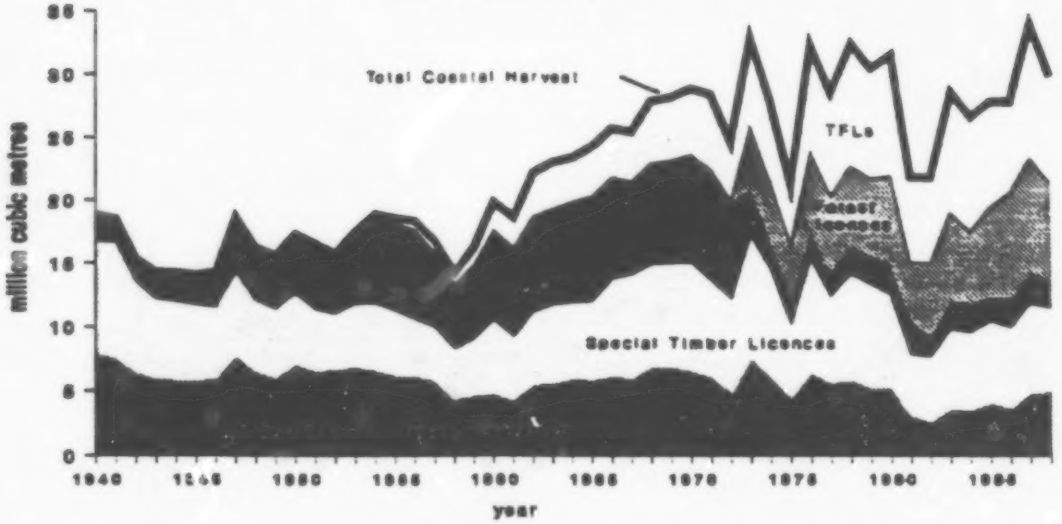
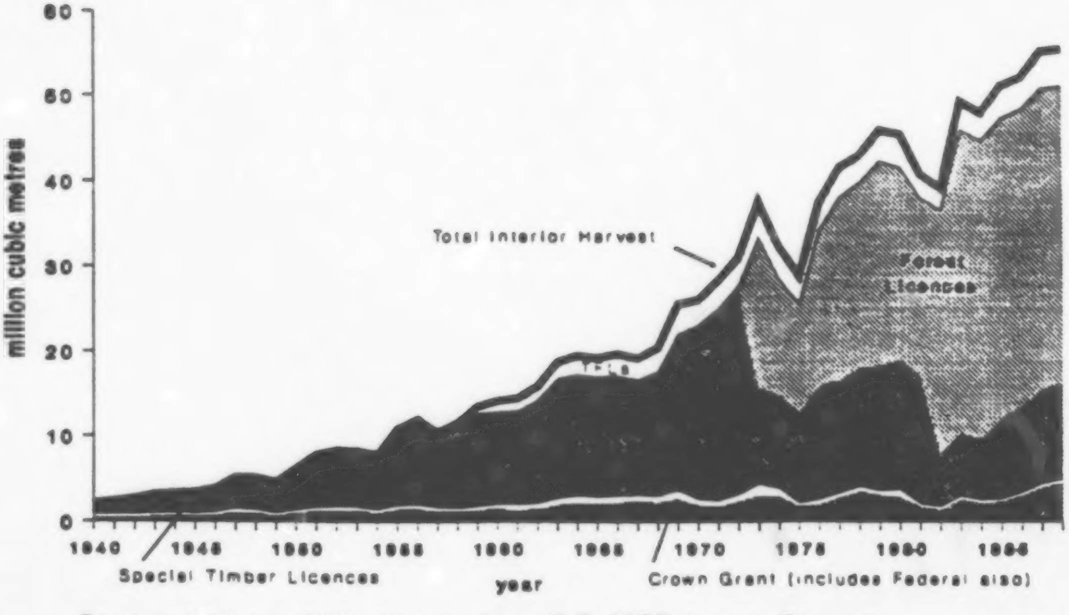


Figure Two

Interior Harvest Volume



Source: Leitch (1992) derived from B.C. MOF Annual Reports.

Figure Three

B.C. Lumber Shipment Volume 1951-1990

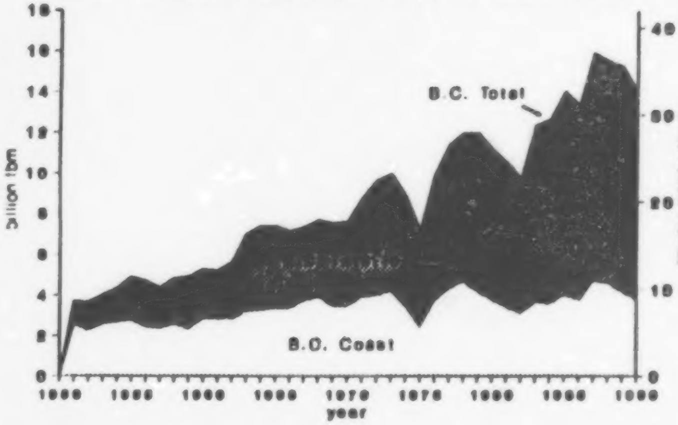


Figure Four

B.C. Lumber Shipment Value 1964-1988

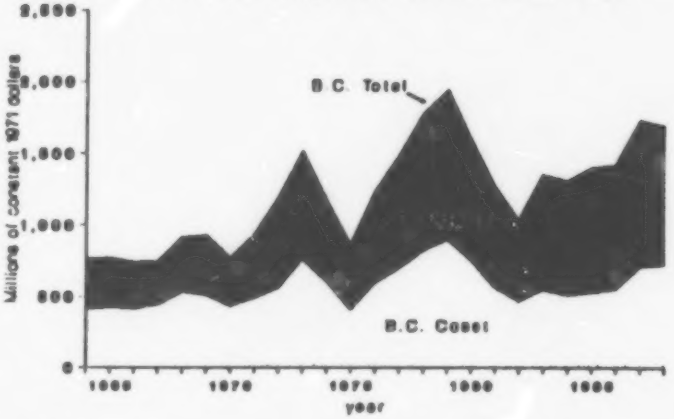
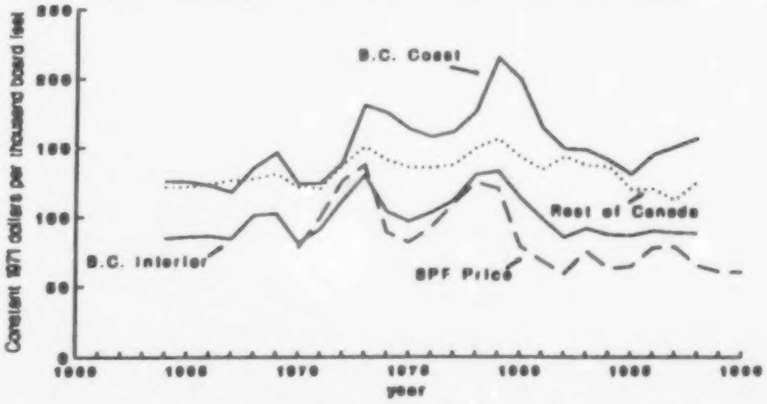


Figure Five

Unit Values of Lumber Shipments 1964-1988



Source: Leitch (1992) derived from Statistics Canada, Forestry Canada and COFI data.

Figure Six

Number of Sawmills in B.C. 1951 to 1988

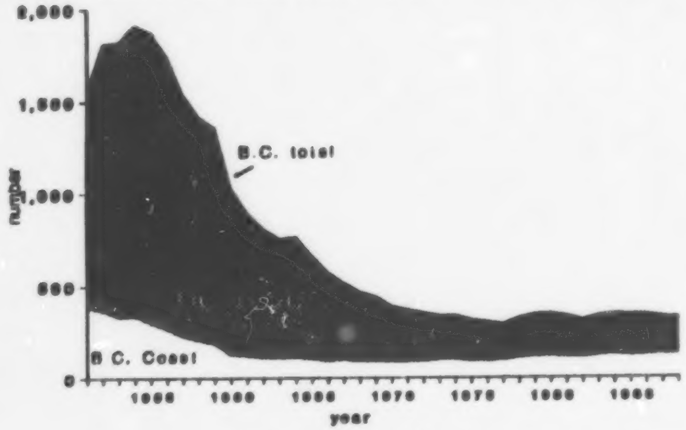


Figure Seven

Average Mill Size by Shipment Volume 1951-1988

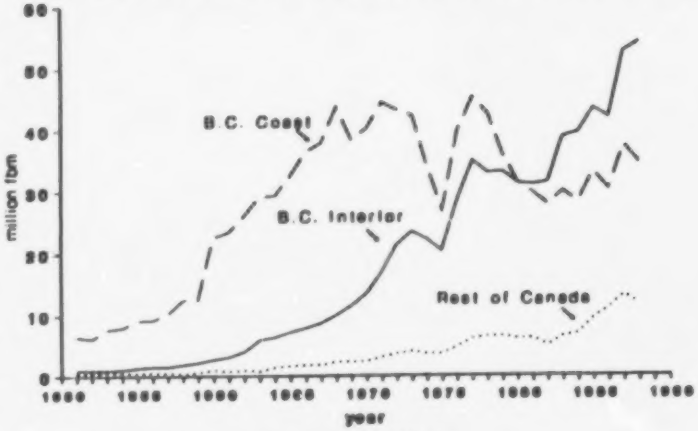


Figure Eight

Average Labour Productivity 1951-1988

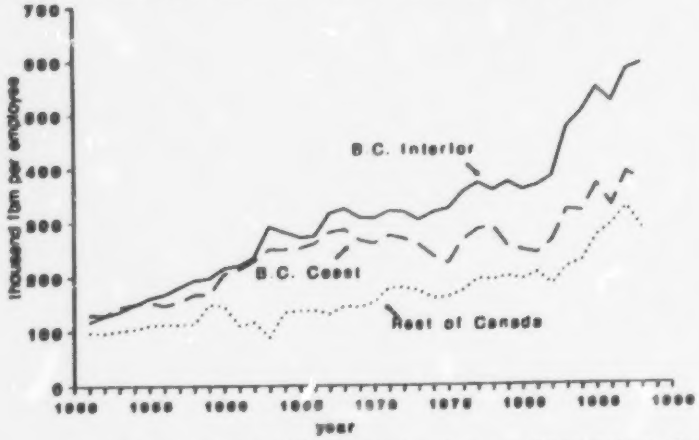
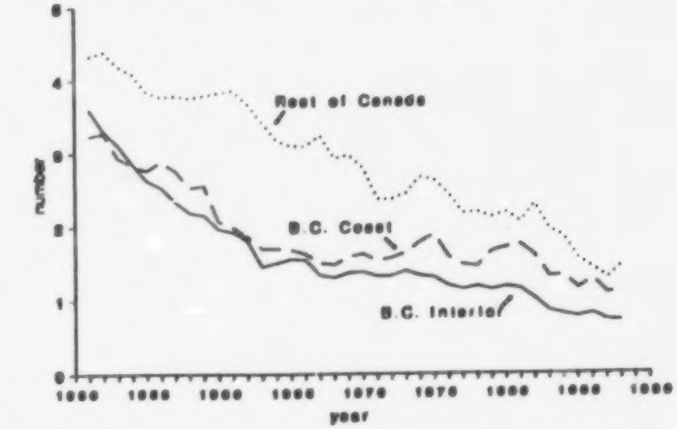


Figure Nine

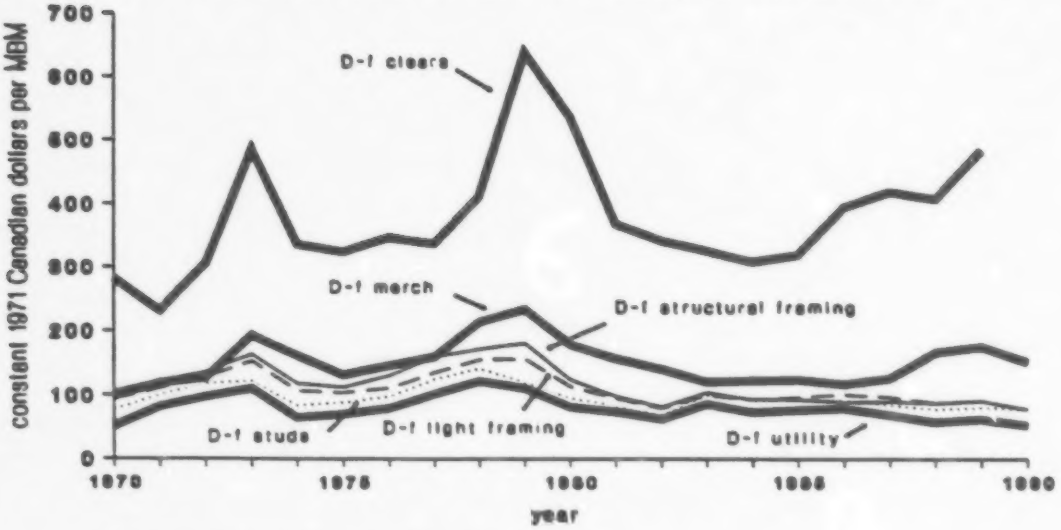
Employees per Thousand Cubic Metre of Shipment



Source: Leitch (1992) derived from Statistics Canada and Forestry Canada data.

Figure Ten

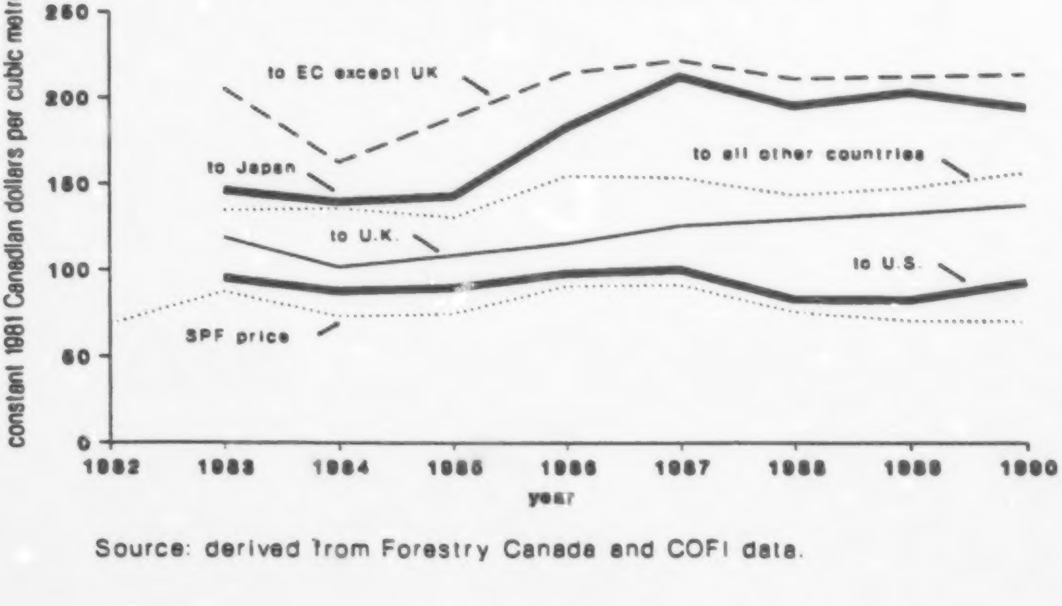
Trends in Real Prices for Douglas-fir Lumber



Source: adapted from Olivotto (1987).

Figure Eleven

Unit Values For B.C. Lumber Exports



Source: derived from Forestry Canada and COFI data.

Figure Twelve

Volume of B.C. Lumber Exports by Region

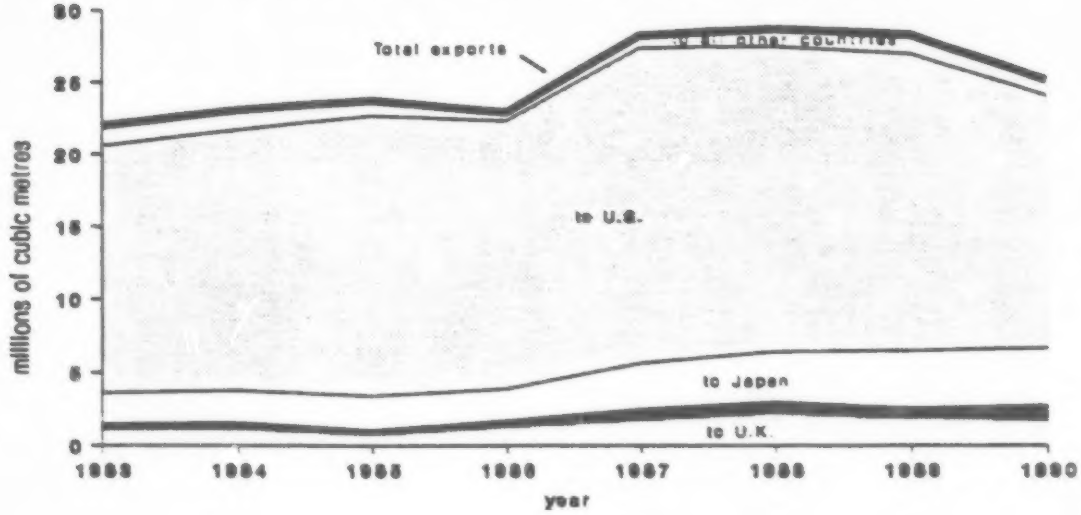
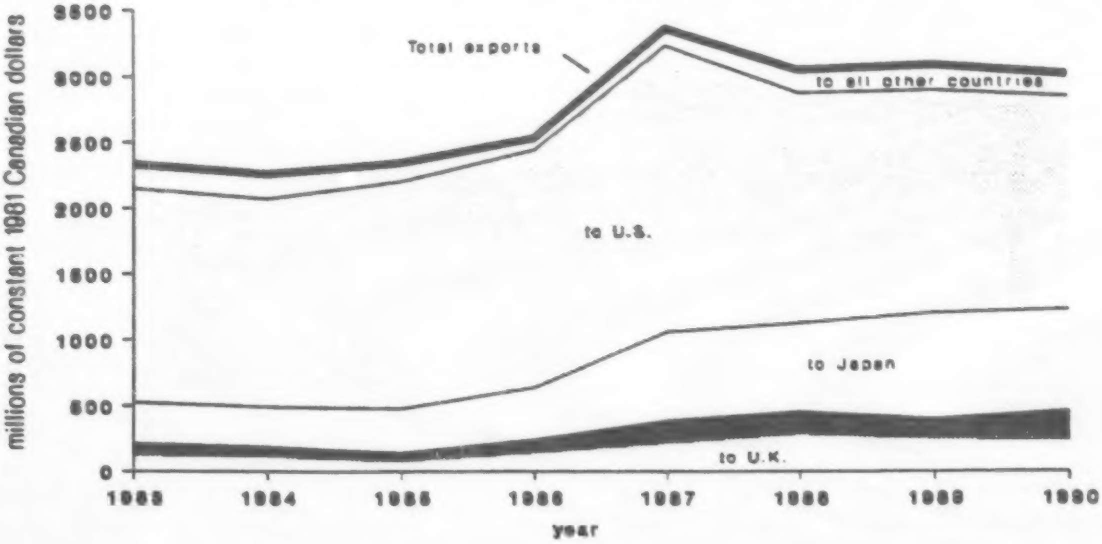


Figure Thirteen

Value of B.C. Lumber Exports by Region



Source: derived from CFS Selected Forestry Statistics and COFI.

ANALYTICAL FRAMEWORK

In this section, some basic economic theory will be presented which will provide a framework for the analyses carried out in the remainder of the report. It will also assist the reader in understanding the economic forces which play a major role in determining the development of the wood products sector, particularly with respect to the industry's product profile, and will offer preliminary insights into some of the important issues facing public policy analysts.

Distribution of Economic Output

Economic activity transforms society's resources into goods and services which are demanded by consumers and have value. An appreciation of how this value is distributed, or shared, between the owners of the various inputs which contribute to its production is a useful starting point in gaining an understanding of the productive process and the economic imperatives which drive firms to choose a particular manufacturing technology or produce a certain type of product.

In simple terms, Figure Fourteen illustrates how the value produced by a firm operating in the wood products sector is distributed. The gross value of all products produced by the firm, which is represented by the size of the pie, must cover the costs of materials (including wood and energy), labour, capital, profit (without which a firm would not take the risks necessary to stay in business), and taxes.

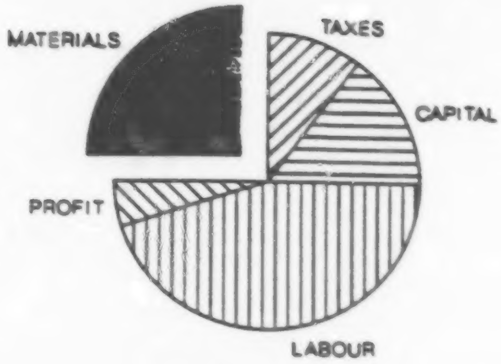


Figure Fourteen

Distribution of Total Value of Wood Products

What is Value Added?

The value added by a firm or, in aggregate, by an industry, is the residual which remains after the costs of all material inputs have been subtracted from the total value of production. For a firm in the wood industry:

VALUE ADDED = PRODUCT VALUE - COST OF MATERIALS (incl. WOOD)

Referring back to Figure Fourteen, it can be seen that the value added is the margin available to compensate labour and capital, provide a profit and meet tax obligations.

Value added, although it has a very precise meaning to economists, is a term which is used loosely and often inaccurately by others. Public sector policy analysts sometimes measure the performance of an industry in terms of its value added, the perception being that the greater the value added the more efficiently a firm or industry is utilizing its raw material inputs. In fact, higher value added does not equate with greater efficiency. As is evident from Figure Fourteen, greater efficiency requires that the total size of the pie, which represents the gross value of production from a certain quantity of raw material and other inputs, is increased. Increased value added may result simply from a redistribution of the total available product value. For example, the returns to labour in the form of wages may increase at the expense of returns to wood, as measured by stumpage or log values. The difference between *efficiency* in production and the *distribution* of the value produced is an important distinction in public policy analysis and one which we will return to later in this report.

It is also common practise to equate value added with more highly manufactured products involving more labour intensive methods of production. Higher value added may result from a capital intensive process such as the production of laminated veneer lumber. In this case a higher proportion of the value added will be in the form of profits and less will accrue to labour as wages.

The most common misconception is to equate high value added with a high return on the raw material or high value of the raw material. This is particularly exemplified by log exports. These can yield the highest value for the raw logs, and often a high margin for the operator in terms of the difference between costs added and value added. But the value added to the log through export is usually less than that added in domestic processing except in the special circumstances when the export price for the log is actually higher than the price of the lumber that domestic processing of the log could provide. However, even though less value added is usually generated by exporting a log than by domestic processing, this does not make log exports economically inefficient. The domestic processors may be unable to add value to the log unless they can obtain the log for a price that allows the costs of conversion to be covered by the revenue received for the converted product.

Why Do Firms Choose to Manufacture a Certain Mix of Products?

Firms pursue maximum profits. This goal may be constrained by other objectives such as growth in sales, market share or protection of share holders equity but, nonetheless, profits are the most important force underlying each firm's choice of what products to produce and how to produce them.

Profit is simply:

PRODUCT VALUE - COST OF MATERIALS
- COST OF LABOUR AND CAPITAL - TAXES

Firms choose that combination of outputs, inputs and processing technology which, they believe, will maximize their profit margin. That is, they adopt strategies designed to maximize their share of the value added. If a firm changes the mix of products it produces - for example towards a greater proportion of more highly manufactured products - it does so because these changes improve profitability, not because they increase the gross value of the products produced from available raw material or increase total value added. An example will illustrate this simple but important point:

	STRATEGY A $	STRATEGY B $
Product Value	150	180
Material Cost	50	50
Value Added	100	130
Labour Cost	50	95
Capital Cost	20	15
Profit Margin (pre-tax)	30	20

Although Strategy B results in higher product value and higher value added than Strategy A, it also adds costs in the form of higher labour inputs and, since it reduces the profit margin available to the firm, will not be adopted.

Many factors may stimulate a firm to seek products of higher value or adopt new processing methods. A decrease in the market value of the products it currently produces, or an increase in raw material prices, for example, each reduce value added and cut into a firm's profit margin. The firm might react to this new situation by trying to reduce production costs per unit of output (i.e., make more efficient use of capital and labour inputs). This might be accomplished by adopting new technology and/or increasing the scale of operation. Such a strategy could, and frequently does, reduce labour inputs. Or, the firm might try to increase the market value of the products it manufactures. However, the course of action the firm chooses will be the one which provides it with the highest profit margin.

Thus, because a product is subject to a higher degree of manufacturing and, therefore, is considered a more "desirable" industrial output in that its production contributes more "value added" to the economy, does not mean that it provides firms with the necessary incentives - higher profit margins - to produce it. It also may not provide a sufficient residual to compete with other less value added products for the raw material. That is, it may provide lower not higher stumpage.

Public Objectives

Governments have their own goals and, given their primary concern for the welfare of the society they represent, it is not surprising that these are usually different to the goals pursued by the private sector. In jurisdictions such as British Columbia, where forest resources are publicly owned, governments are generally concerned about the magnitude of financial returns to public timber resources and that the number of people employed in timber harvesting and processing is maintained at an acceptable level.

The return to timber resources (which economists refer to as economic rent) is:

PRODUCT VALUE - COST OF NON WOOD MATERIALS - VALUE ADDED

Returns to timber owners (private or public) depend, to a great extent, on the characteristics of the markets in which the resource is sold. It is generally accepted among economists, and increasingly among public policy makers in British Columbia, that competitive timber markets will tend to maximize resource values and encourage efficiency in the harvesting and processing sectors. In competitive markets, buyers, in competition with each other for a limited resource, have strong incentives to choose the product mix and processing technology which maximizes the price they can pay for timber while maintaining acceptable profit margins. Such arrangements encourage efficiency by ensuring that the value of the product mix is as high as possible given the constraints imposed by available technology, the costs of labour and capital, and acceptable profit margins. It should be emphasized, however, that such arrangements will not necessarily satisfy the employment goals of government, nor are they designed to do so. In the competitive markets described, the amount of employment created is incidental to a decision making process driven by a goal of greater efficiency. For a given product value, the *lower* the value added the *higher* the return to the resource. Private sector firms in pursuit of acceptable profit margins, have strong incentives to economize on the use of both labour and capital. How much labour is used relative to capital will depend on available technology and levels and trends in wage rates relative to capital costs.

TIMBER ALLOCATION, INDUSTRY STRUCTURE AND PRODUCT MIX

The major focus of this study is the interrelationships which exist between timber allocation, forest industry structure and the mix of products produced. In this section, following a general analysis of the factors underlying the product mix of the solid wood products sector in British Columbia, these relationships will be explored in more detail with specific reference to the development and current conditions which prevail in the Interior and on the Coast of the Province.

DETERMINANTS OF THE PRODUCT MIX

As explained earlier, firms in the forest industry, as in any industry, choose that combination of outputs, inputs and processing technology which will, in their opinion, maximize their profit margin. That is, they adapt their strategies to the environment in which they operate in ways which increase their share of the value added.

Any change in a firm's environment, either as a result of changes in the market place for outputs or inputs or as a result of public policy, may cause a firm to modify the mix of products it produces. A decrease in the value of its product mix will encourage a firm to seek ways to reduce production costs and/or increase product values in order to maintain its profit margin. Similarly, an increase in costs will cause comparable reactions.

How firms in the solid wood products sector in British Columbia would react to a change in timber allocation policies resulting in free market access to timber supplies depends on a number of important factors. These are described below.

First, producing a higher proportion of products that sell for a higher price is only an option if those goods can actually be sold. Thus, constraints imposed by market conditions have to be considered in assessing firms' behaviour.

Second, the production of higher value products almost invariably involves additional capital and labour costs, that is value added is increased. However, as discussed earlier, ignoring non-timber materials, the difference between the value of output which represents the gross return to the processor and value added is the residual, or stumpage, that can be paid for timber inputs. . Firms will only shift production towards the manufacture of any product if the revenue it generates exceeds the total costs of raw materials and labour and capital inputs by the amount necessary to provide an acceptable profit margin. Any product which fails to meet this requirement, from an individual firm's perspective, will not be produced. Even if a product does meet this criterion, it may not be produced if there are more profitable alternatives. The optimum product mix, as far as a firm is concerned, is the one which maximizes its total profit margin. Thus, the availability and costs of the capital, labour and material resources required to produce more highly manufactured wood products are important considerations.

A third consideration concerns type and scale of technology chosen. At present there are many small wood products firms manufacturing products of higher value in British Columbia. Not only are these firms and plants much smaller in scale than the primary commodity producers, they also employ more people per cubic metre of timber consumed. Thus, we must ask whether there are technical, or other, advantages to small scale and labour intensive technologies in the production of more highly valued wood products.

The fourth consideration is the condition of access to timber. Under the current system, access to timber is largely determined by public policy. Since this is a discretionary system, not all processors face the same conditions in terms of price and access to timber. In addition, timber availability to primary processors means logs, but to remanufacturers and secondary processors it means lumber. These facts must be considered when assessing the potential impacts of policy changes. Processors, with some form of Crown timber rights, can be classified as follows:

- Major tenure holders, who hold quota in the form of long term tenures, and pay stumpage at appraised rates. They pay their own silviculture costs though these are taken into account as a cost in the calculation of appraised stumpage. They are expressly excluded from SBFEP sales.

- Owners of primary breakdown facilities who hold Category 2 small business sales obtained through competitive bidding. This category exists only in the Interior. They pay stumpage at a rate above appraised value by an amount equal to the sum of their bonus bid plus a silviculture levy.

- Owners of remanufacturing facilities who hold 16.1 sales obtained through the bid proposal programme. There is a bonus bid component in stumpage since these are awarded competitively, but the main criterion on which the competition is determined is the amount of value added generated by the proposed manufacturing facilities.

- Owners of integrated primary breakdown and remanufacturing facilities who hold 16.1 sales obtained through the bid proposal programme.

We are particularly concerned with the impact of timber allocation policies on the competitive position of smaller firms. Can such firms compete successfully for raw material against larger, more capital intensive firms if, particularly, the programmes which provide them some measure of support are abandoned?

The response of firms to questions concerning current policy and their attitudes towards policy changes, depend a great deal upon their current circumstances. These disparate viewpoints do not imply conflict, rather they represent varying opinions on the same problems as seen from different perspectives.

In the remainder of this section, the questions posed above will be addressed. This discussion relies heavily on the information gathered during the course of interviews with representatives of the individual firms and industrial organizations described in Appendix Two. Conditions common to both Coast and Interior are discussed first, followed by separate analyses for the Interior and the Coast.

HIGHER VALUED PRODUCTS AND MARKETS

One of our interviewees summed up the importance of markets as follows:

> "The market place is the ultimate determinant as to how much value you can add. The higher the product value the closer to market it is better to produce it."

The first distinction to be made in examining the potential for products of higher value is between those that can be produced in primary breakdown and those that involve further manufacturing in separate facilities.

Adding Value in Primary Breakdown

In primary breakdown the unit value of the output varies with the size of lumber produced. A generic 2x4, has less value per cubic metre than a board which requires extra cutting, since boards are 1 inch thick, or a wider dimension piece such as 2x12. Changing the size of the output involves additional costs and, thus, is a value added activity. However, as pointed out above, it will only be engaged in if the end product price is raised sufficiently to cover the increased costs.

Another value adding activity that can be performed at the primary breakdown stage is separation of logs by species. There are certain markets which have a preference for certain species and there is, therefore, a premium to be had for separating logs by species before processing. There are costs involved and, again, the extra value will only be added if the premium obtained for doing so exceeds the added costs.

A third type of value adding activity that can be performed at the primary breakdown stage is separation of lumber by quality - the process known as grading. Sorting for grades is worth doing provided the increased price covers the cost of the sort.

Lumber value can also be improved during the primary breakdown process itself. This may involve a trade-off between the premium obtained for width and the premium obtained for grade, since high grade clear wood should not include either the juvenile core of a log or any exterior knots.

In each of these cases the premium is affected by the price of both the regular output and the higher value output. The necessary premium to justify the additional cost may arise from either an increase in price of the higher value alternatives or a drop in price of the regular output mix.

Because of British Columbia's relatively low population, the provincial forest products industry is heavily dependent on the export market. Different markets demand different products since standards for sizes and grades are region dependent. Within the North American market the premiums for various sizes and grades are well known. The size of the market, however, gets considerably smaller the higher the grade, and price could thus be affected by a sudden increase in supply. A different set of sizes is required for the Japanese market where, in addition, there is much more emphasis on both quality and species. This is also the case for European markets.

The domestic remanufacturing industry is also a customer of the primary lumber producers. This sector has a preference for lumber sorted by species and by sizes and grades that are not standard to North American commodity lumber markets. While this market accounts for 60 per cent of domestic lumber sales in British Columbia and 11 per cent of total shipments of the provincial lumber industry, it cannot be regarded as competitive in the sense of having a large number of buyers and a large number of sellers. Instead, it could be classified as a contract market since the consumer has to negotiate for a certain amount of a specific product. Under these circumstances, the premium is determined by the seller according to an estimate of the additional costs involved in doing the necessary sorting.

A further option for primary mills is to have some of their output upgraded by a custom remanufacturer. This has the disadvantage that the seller, who is dealing directly with the customer, does not have control over the actual production process since it is being done by a contractor. An extra level of transactions is thus involved.

Adding Value in Remanufactured Products

The remanufacturing sector produces a wide range of products as described in an earlier section of this report. With the exception of products such as finger jointed lumber or MSR lumber the products of the remanufacturing sector cannot be described as commodity products. The specifications of the product thus depend on the market for which it is destined.

Since our small population limits domestic demand, this sector must also seek export market opportunities. The fact that British Columbia is a considerable distance from most final markets has two implications. It is generally agreed that the more specialized a demand the closer to the final customer the product should be produced. There is an information cost imposed by distance. In addition, the smaller size of shipments and the need for careful handling and packaging increases unit transportation costs above those for commodity items. Thus, we compete as a marginal producer of further manufactured goods.

The main North American market for remanufacturers is to retailers who supply do-it-yourself items to end users. However, the major markets targeted by the remanufacturing industry are the offshore markets with particular emphasis on Europe and Japan. The products demanded by these markets are very different but they share the characteristic that a very high premium is put on quality. The premium on quality can be considered to equal the entire price of the item in fact, since a market does not exist for low quality products. Species, size and grade are all important, with variations in regional preferences.

The physical characteristics of the product are not the only attributes demanded by the market. Service is also part of the package, and this involves prompt delivery and also continuity of supply. These are markets in which product differentiation is possible and where premiums are attached to brand name products. There is also loyalty to a proven supplier, up to a certain price difference at least.

There are various cooperative industry and industry-government initiatives in place to facilitate and enhance market opportunities for B.C. and Canadian remanufacturers. These include the long established Cooperative Overseas Market Development Programme (COMDP) and the recently initiated Cooperative Industrial Market Development Programme (CIMDP) of the British Columbia Wood Specialties Group.

INPUT COSTS AND AVAILABILITY

Capital

There was general agreement among those interviewed, that there is a direct correlation between access to capital and security of raw material supply. Independent primary processors confirmed this in explaining that one reason they wanted access to quota for themselves was to obtain financing for upgrading. Existing tenure holders with primary processing facilities confirmed this through the doubts they expressed concerning reinvestment to update facilities in light of quota reductions. They saw the reduction in their quotas to provide timber for 16.1 sales as taking away their stability and reducing the likelihood of either existing owners or banks putting money back into mills.

From the perspective of those who received the 16.1 sales the security of supply offered by them was seen as a considerable asset. There has been considerable demand for them as they offered the chance for new entrants to attract the necessary financial support for their ventures. Furthermore, existing operators who received 16.1 sales said they had expanded their operations as a result.

As far as access to capital for the financing of remanufacturing projects within large integrated firms is concerned, a different problem was encountered. They have the raw material available, provided the supply cost can be met, but often the scales of the projects are too small to be considered worth the transactions costs that are involved in getting approval for such capital expenditures through the various administrative strata of large corporations.

Labour

There is a difference in perspective with respect to labour costs between major tenure holders with primary breakdown facilities, who are interested in investing in remanufacturing facilities, and the smaller existing remanufacturing plants. Within the primary processing sector there is industry wide bargaining between member firms and the union, and it appears that non-union firms, or individual non-union plants within firms, also pay union rates.

At present, the remanufacturing sector is more labour intensive and less high-tech than the primary sector. There are thus more semiskilled jobs as compared to the technically skilled labour required in a large modern sawmill. The large firms, who already employ union labour in their primary breakdown plants at rates which reflect the high labour productivity of these capital intensive plants, feel that they would be forced by unions to pay comparable rates in remanufacturing facilities and that this would put them at a disadvantage compared to smaller existing operators whom, they believe, are not unionized.

On the other hand, there are unionized remanufacturers, as well as remanufacturers integrated backwards to primary processing facilities, who have negotiated their own labour agreements. In fact, a 1988 study (Deloitte, Haskins and Sells) found labour rates in the primary sector ($15.99 per hour) to be only marginally more than in the remanufacturing industry ($15.41 per hour). As the remanufacturing sector expands, there will be pressure for employees to become more organized. Workers in British Columbia have come to expect an income which allows them a high standard of living. Independent firms view their major competition as plants situated south of the border where wage rates are generally lower. Their perception was that large integrated firms would be more likely to set up remanufacturing plants there to take advantage of low wages.

Unions represent a distortion from pure competition in the labour market, as indeed do minimum wage guidelines. In order to produce remanufactured goods at a competitive cost using labour intensive technology it is necessary either to lower wages or to reduce other costs. Paying a high wage certainly represents an increase in value added, but if the end product price is fixed then this can only be done at the expense of the price which a manufacturer can afford for materials, including timber.

The alternative is to develop higher tech production processes. There is some cooperative research underway in this direction. Sophisticated technology requires more highly trained employees and there are some retraining efforts underway. A more highly educated workforce has indirect benefits for the public but it does nothing to address the issue of raising the level of employment in the forest industry sector.

TECHNOLOGY TYPE AND AVAILABILITY

Availability

There appeared to be general agreement, among those interviewed, that the technology available to B.C. producers is competitive with that available elsewhere. One person put it this way: "On tour in Germany I didn't see anything we don't have."

Related to this question is the ability to make best use of the available technology. This concerns both the quality of labour, as has been discussed above, and the quality of raw material being processed. This latter point is discussed in a later section on raw material availability.

Type

There was no single answer to the appropriate scale of technology for production of higher valued products. It was generally agreed that secondary manufacturing required small scale. This was at least partly due to the need for quality control and the shortest distance for direct communication between production workers, decision-makers and those who deal directly with customers.

With respect to the appropriate scale for producing higher valued output in the primary processing sector there was a distinction between Coast and Interior. On the Coast, firms with large mills felt they had both a timber access and cost advantage and as much flexibility as smaller mills. In the Interior, large mills were viewed as handicapped in the production of higher valued products through lack of flexibility.

A related consideration is the degree of process integration necessary to produce speciality high-valued products. It was argued by some experienced remanufacturers with their own primary breakdown facilities, that they actually began the process of raw material selection for their end product in the woods. Species selection is involved, and also log bucking to specific lengths. From there, the specialization continues through primary breakdown in the choices of sizes and grades cut.

TIMBER ACCESS

The relevant question with respect to availability of raw material is whether the constraint is a matter of price or is there an absolute constraint on access to raw material at any price. To address this question it must be further analysed according to raw material type and purpose. Primary breakdown sawmills, which produce specialty further manufactured products, require access to raw logs. The raw material required by remanufacturers is lumber. Lumber producers who supply remanufacturers require logs and remanufacturers who are integrated backwards into primary breakdown also require logs. In some specialized cases it could be argued that sorting for value added has to begin with the standing timber, as once a log has been cut and put on the market it may have already lost value through being the wrong size.

There are different access problems in each of these categories between the Coast and the Interior. However, the Small Business Forest Enterprise Program is Province-wide, with the exception of Category 2 sales which are found only in the Interior. It is accepted that Category 1 sales have been successful in increasing stumpage revenues for the government through a competitive bid process, the timber going to the highest bonus bid. However, it is also accepted that this market timber has not significantly reduced any entry barriers faced by value-added primary processors.

nor encouraged any primary processors to enhance their product lines in ways which make them more accessible to secondary processors. In the Interior and on the Coast, most of the logs from Category 1 loggers are purchased by the major tenure holders or, in the case of the Coast, end up in the log export trade.

In contrast, there is almost unanimous agreement that 16.1 bid proposal sales have resulted in increased access to lumber for remanufacturers. Most of this timber was taken from the quotas of primary processors, and in most cases it is they who actually log and process the timber from the 16.1 sales. Access to the timber has apparently been the key to making it worth while for the majors to do business with the remanufacturing sector. This timber came out of the 5 per cent reduction of major holders' AAC in 1988. Through the mechanism of the bid proposal sales, not only has a source of raw material been opened up for the remanufacturing sector, but also stumpage revenue to the Province has increased since sales are above appraised stumpage, though generally not as high as the Category 1 bonus bids. 16.1 sales to primary processors producing specialty products and to those small primary processors who have traditionally supplied the remanufacturing sector appear to have been a minor fraction of the programme.

Section 16.1 is recognized as an explicit affirmative action programme which provides help to remanufacturers in two distinct ways. It provides some security of supply which can be used to get financial backing and also to reassure potential customers. Second, it provides remanufacturers with access to the lumber they require. Since this lumber comes from the majors, it is not entirely clear why it was not available prior to the 16.1 programme. The main reason usually given concerning the lack of accessible lumber for remanufacturers is that the barrier is price. However, we were assured by participants in the programme, both major and independent, that when access to timber from 16.1 sales is traded for lumber, the remanufacturers concerned are getting no special price concessions on their raw material. On the other hand, those established operators whose raw material supply was displaced by the new entrants under 16.1, assert that newcomers are being subsidized in some way and would not in fact be able to compete against their hard won experience on a level playing field. In addition, they suggest that the programme may not be enhancing the further manufacturing sector but merely displacing established processors.

Thus, while the concept of 16.1 is generally applauded as a means of helping the immature remanufacturing industry, there is less enthusiasm for its actual implementation. A particular concern was that many of the proposals are not yet off the ground and that this, effectively, freezes the allocated timber and correspondingly reduces the overall available AAC.

The implications are that, quite distinct from any perceived allocation barrier to the expansion of the further manufacturing industry in British Columbia, there is an economic barrier - a cost barrier - in terms of affordable price for raw material, . The high speed, high volume commodity mills are seen as a product of earlier timber allocation policies. The quota system, leading to long term, replaceable forest tenures, was the driving force that enabled capital investment in these large efficient mills. An additional factor which enabled the development of the existing industry was subsidised access roads which expanded the economically accessible limits to timber harvesting. One interviewee put it this way:

> "Years ago we gave section 88 and stumpage rebate for roads into the forest; now the roads we need to build are those to the markets and they cost a lot, and we need help to build them."

THE INTERIOR

HIGHER VALUED PRODUCTS AND MARKETS

Adding Value in Primary Breakdown

In the Interior, sorting by size, grade, and species does not yield premiums as high as those obtainable on the Coast because interior logs are more homogeneous. The premiums do exist, however, and if they can be profitably obtained they represent a way of adding value.

Log sorting is much less common in the Interior than on the Coast because most of the wood that is harvested is a mixture of spruce, pine and fir. These can go through a sawmill interchangeably without affecting the process settings and are usually sawn and marketed as a single species mix - SPF. Interior logs are also usually of more uniform dimensions than Coastal logs. There are premiums to be had in certain markets which show species preferences. However, given the scale and speed of the commodity processors, the costs involved in separating logs by species before processing have tended to outweigh the premiums.

Interior dimension mills usually include huge J-bar sorters which deposit different grades and sizes into separate bins. The size range is usually limited to those produced for the North American market. The premiums for various sizes and grades within this market are well known.

For various reasons, relating mainly to the proximity and the traditional high demand of the North American market, sawmills in the Interior have not varied their output spectrum to include sizes and grades suitable for offshore markets. Because of the current decline in the North American market, and especially the decline in prices for commodity lumber, this could begin to change in the Interior and mills there may follow those on the Coast and start cutting for Japanese and other offshore markets. This is likely to be the case when facilities require replacement or renovation.

Different sizes than those of dimension lumber are also usually preferred by remanufacturers. As yet, there does not seem to be any move on the part of large Interior primary operators to seek out a market for specialty sizes and grades among remanufacturers. Changing to the standards for a different region requires a more complex intervention as the settings for the breakdown process have to be altered. The unit cost of doing this escalates if only small quantities are demanded. Individual remanufacturers thus find the prices charged are beyond their ability to pay, while primary producers say the demand is insufficient to provide premiums to cover the costs. In addition, the custom remanufacturing sector is not nearly as well developed in the Interior as it is on the Coast.

In contrast to the large processors, whose lumber is mainly destined for export, the very small processors who qualify as Category 2 registrants sell most of their lumber locally. Some of this is a continuation of the traditional market of the pioneer mills of the Interior - supplying directly end use local customers such as farmers . But the market for a considerable portion of the output of Category 2 sawmills is the lumber remanufacturing sector.

Adding Value in Remanufactured Products

The markets being targeted by the remanufacturing industry in the Interior are the same ones in which Coastal expansion has already begun. These are the offshore markets with particular emphasis on Europe and Japan. Because of the emphasis on quality, there was varied opinion among producers about how far along the value add chain it is possible to proceed. Sorting for species and grade were viewed as value-add activities for which there was a strong demand, or at least for which a strong demand could be created through careful marketing. The tight grain of the slow growing interior species was generally viewed as a positive attribute of interior wood for these markets. However, remanufacturing beyond the point of blanks for joinery stock was seen as rather more difficult, given the physical distances to the customers served and, also, the cultural differences in understanding the type of craft work involved.

Most of the remanufacturers interviewed in the Interior did not see market demand as a problem or a constraint on expansion. Whether they could meet the conditions of the market, at the market price, was a different matter. Our sample was, however, weighted towards small firms, well established in remanufacturing, who emphasized that they had started small in terms of production and had invested a lot of time in building a clientele. Some pointed out that getting a foothold in the market was a prerequisite without which the benefits provided by 16.1 sales of improved access to raw material and capital were of much less assistance.

A different perspective was taken by producers used to dealing with a different scale of operations. An example of the contrast in scale between dimension lumber production and remanufacturing, which is reflected in the perception of market size, was given by a representative of one large integrated firm that had recently invested in its own remanufacturing plant. The manager of this plant said that the project had started small but grew and is now bigger than intended. In a single product line it has an output of a trailer load a day (38-40m^3). There is a good market for 50 percent of what is produced but poor markets for rest. This is in contrast to the US market for dimension lumber where everything produced can be sold.

Another example was given concerning the board market, which is considered to be a specialized value-added market. Many mills produce some boards but there is only one mill which specializes in board production and it is of intermediate size - small compared to dimension mills but large compared to remanufacturers. The comment was made: "Couldn't have 20 Gormans in BC. Market wouldn't be there."

Markets present extremely important constraints which are linked to transportation costs and British Columbia's position as a marginal producer situated far from major consumers. In addition to concerns about the high cost of transportation, there are also concerns about the riskiness of transportation due to the modest size of shipments. Most firms are unlikely to be producing sufficient volumes to fill a whole container at one time, not to mention finding customers interested in buying a whole container load. The service aspect is also important. Stores want to buy boxes not truckloads. Yet a product has to have considerable value to be worth shipping in small quantities. The deregulated transportation system in the US, it was suggested, offers an advantage to US competitors.

INPUT COSTS AND AVAILABILITY

Capital

The smallest operators, the Category 2 owners, stated that no lending institution would look at them because they did not have supply security. The remanufacturers pointed out that they had to give personal guarantees to the banks and got charged maximum interest rates. One well established integrated remanufacturer explained it as follows:

> "The banks didn't feel secure with us. Most mills get financed because of quota. It helped when we started to bid on timber sales. That allowed the building of the present plant in 1984, the original one was much smaller."

Existing tenure holders in the Interior were particularly unhappy with reductions in quota that had already occurred and saw these as detrimental to the likelihood of either existing owners or banks putting money back into mills. There are several reasons for this heightened concern. First, overcapacity in the Interior is more severe than on the coast and the competition for available timber is more vigorous; second, firms in the Interior started from a lower level of captive supply than on the Coast; and, third, many feel they have property rights in quota because it has been purchased at a high cost from other operators rather than being awarded directly by the Crown.

Labour

There was some discussion of the different types of skills that were required in producing and handling specialty items. This is one area where it is perceived that more training of the workforce is required.

We did not hear directly in the Interior the complaint that British Columbia lumber is being shipped to remanufacturing plants in the US Pacific North West because of lower wage rates there. However, this was implied in comments that related to the availability of materials. It was stated that large integrated primary processors are shipping their output to remanufacturing plants south of the border in preference to selling to local remanufacturers. Implicit in this was that local remanufacturers could not afford to pay as much for their material input because of the value add costs of labour.

There was a strong feeling that workers in B.C. should be the ones to add value to B.C. timber. This was part of the rationale used by the small Category 2 operators in arguing the importance of their continued existence.

TECHNOLOGY TYPE AND AVAILABILITY

Availability

Among the specialty producers there was an implicit suggestion that craft was more important in the production of their goods than science. This was associated with a pride in workmanship and the idea that their technology was not inferior to that elsewhere.

Type

In the Interior, small, specialized, primary processors have the technical flexibility to produce variable quantities of diverse products but their unit costs are much higher than the highly efficient large scale primary processors. However, this is not true when a small quantity of a particular size is produced. When a high speed, volume oriented mill is asked to produce a small volume of a particular product, which differs from the normal mill run, the costs involved in making a special production run make it very expensive. The high efficiency of large mills is premised upon their being used at capacity because fixed costs make up a large proportion of total costs. Providing such mills are used at capacity, then small mills are economically inefficient by comparison.

However, as discussed earlier, as the premium increases between the price of commodity products and alternative outputs, driven especially by falling real prices for commodity products, then there is more incentive to produce a wider range of outputs. Flexibility then becomes a more valuable technological attribute. It is precisely this attribute which is offered by the small Category 2 primary processors, and which has allowed them to be the traditional suppliers of the remanufacturing sector in the Interior.

Given changes in market demand and limits to timber supply, industrial restructuring and technical changes will occur. More flexible mills may have different economies of scale. The problem from a public policy perspective is in managing the transition. However, it is end product markets and available technology rather than stumpage or log markets which will drive this transition.

TIMBER ACCESS

Value Added - Primary Breakdown

A very high proportion of the primary processing capacity in the Interior is dedicated to the production of dimension lumber. The current technology in these mills is very limited in its flexibility to respond to value-added demand. There is some established medium scale capacity which has been successful in finding and serving value-added niche markets. These mills rely on security of tenure and feel that a competitive market, as proposed, would be a hindrance rather than a help to them. For one reason, their ability to find the financial resources in order to keep up-to-date with technology would disappear with the loss of half their quota. In addition, they feel they would be unable to compete with the large timber hungry dimension mills. In particular, they would be disadvantaged with respect to integrated pulp firms who exert oligopsonistic power in chip markets. The low price paid for chips reduces the price that independents can afford for logs. Pulp firms, on the other hand, can incorporate chips at their true marginal factor values in pulp production rather than their internal transfer cost or at the price paid to independents. These considerations suggest that competitive markets would not reduce the barriers for new entrants in this field. The other type of specialty sawmills in the Interior are dedicated to production for their own remanufacturing facilities and are discussed in a separate category.

Remanufacturers Without Primary Breakdown Facilities

There seems to be a consensus that the raw material for remanufacturers is available at a price, but that the price is often beyond remanufacturers' ability to pay. There is a distinction to be made between the various types of raw material remanufacturers are seeking. Some use the current output of the Interior dimension mills, assuming they are able to access it, but only a specific portion of the output rather than the whole profile. That is, they can use certain selected sizes, grades and species. Other remanufacturers require raw material of a size or quality which is not part of the usual output profile of the dimension mills. The size is often unsuitable in that it is too difficult to get a number of remanufactured items from it without considerable waste. An actual 2x4 rather than a nominal 2x4 is more desirable for the production of various secondary items, for example. In addition, the lumber used in remanufacturing often requires the use of different drying regimes to those used in dimension mills, which apparently dry for weight rather than quality. However, once dried, the lumber is very difficult to redry to the appropriate standard.

For remanufacturers who use the regular dimension mill output, their price will still be high unless they buy on the commodity market. The additional costs arise from the additional sorts that may be required for species and the generally small size of the order. In addition, both buyer and seller incur market information costs due to the small size of the market.

With respect to lumber that is not normally present in the output of a major primary mill, the necessary additional costs borne by a dimension mill to produce the required output are even higher. The small number of secondary manufacturers comprising the market for lumber in the Interior has three implications. First, it is hard to know what is a reasonable price. Second, and more important, a primary processor who produces a special run may suddenly find the market has disappeared. Third, the smaller the market the greater the unit cost, or cost premium, incurred in producing for, and selling to, small remanufacturers. One remanufacturer explained it this way:

> "It is difficult for this industry to get its materials because it is so small, it is not recognized as a customer by the primary processors. The cost of doing an extra sort, or running a different size, at present simply isn't worth it for the majors."

The remanufacturers in the Okanagan clearly did perceive access to wood as a major problem and cited this as the major reason for forming the *Interior Value Added Wood Association.* One advantage of an association of remanufacturers is that they could possibly purchase the mill run, or whole profile, of a primary mill and do the sorting themselves. They describe the first priority of their association as follows:

> "Adequate supply of affordable remanufacturable fibre through co-operation with the majors and Category 2 operators."

A further priority is to:

"continue to encourage remanning in B.C. rather than export jobs."

Prior to bid proposal sales, the main source of supply for Interior remanufacturers was the small Category 2 primary mills. Although these mills supplied the sizes required at affordable prices they were considered unreliable at times from the perspective of the remanufacturers as they would sell where ever they were offered the highest price. Since the introduction of 16.1 sales, the remanufacturers have been less dependent on the Category 2 mills as they have a lever for negotiation with the majors. However, it is unlikely they would be helped by the demise of the small independent primary sector which would be the likely consequence of the Commission's proposals, as discussed below.

The 16.1 programme was seen as a positive step in helping the remanufacturing sector in its raw material problems. The recommendation that the bid proposal sales be converted into Resource Management Agreements was interpreted as equivalent to establishing quota for 16.1 and thus increasing their security of supply. There was little concern with the associated management provisions, probably because most 16.1 sales are not logged by the remanufacturer but by the major primary processor with whom they have an exchange agreement. Interior remanufacturers have the same criticism concerning 16.1 sales as Coast remanufacturers. The main drawback to bid proposal sales was seen in its implementation in that it appeared to favour new entrants over existing operators. This was seen as handicapping those who had got established without such help. They felt they were placed in an unfair position relative to the new entrants with respect to competing for available raw materials, and to a lesser extent in the product market. In the market place they felt more able to compensate any cost disadvantages by market knowledge and experience.

While 16.1 is viewed as having increased access for remanufacturers to lumber produced by the majors, Interior remanufacturers also see a new source of competition for them in the growing trend of major, integrated firms to move into remanufacturing themselves, and in particular to establish those facilities south of the border in the United States. They do not feel they could be cost competitive with these plants.

The introduction of a more competitive markets for timber and logs is not viewed as likely to help the secondaries in terms of raw material availability since it seems unlikely to provide primary processors with an incentive to produce an output profile more useful and accessible to them. Indeed, it could be detrimental if the result was more concentration and integration of majors into remanufacturing plants located outside of British Columbia.

Suppliers of Remanufacturers

Two main sources of supply of lumber to remanufacturers have been discussed above - the large dimension mills and the Category 2 operators. They have disparate conditions of access to timber and different associated problems.

The large scale Interior dimension mills need a certain volume of throughput to be able to cover fixed and variable costs in order to operate at all. Once that threshold is passed, only variable costs need to be covered in the production of additional volume. This reduces the value added component of the cost of 'incremental' wood but increases the amount that can be paid for it. Almost without exception, these mills have timber appetites which exceed their timber quotas. The 5 per cent reduction in their quotas to establish the bid proposal programme further exacerbated this gap. The higher cost that can be paid for incremental volumes is reflected in the high bonus bids on Category 1 sales, the logs from which are destined for the plants of major producers. The competitive bidding that takes place for Category 1 sales pushes stumpage prices to the maximum difference between variable cost per unit and the revenue per unit earned on the incremental levels of output. The high demands of these mills is also reflected in the recent steep increases in the amount of private wood harvested in the Interior, the majority of it from unmanaged forest land.

Joint ventures, or exchange agreements, with secondary manufacturers in the bid proposal programme provided a way for dimension mills to recover some of the quota they lost. Due to the criteria which must be considered in awarding a sale, in addition to the amount of the bonus bid, stumpage paid on 16.1 sales is generally lower than that on Category 1 sales. This may allow major companies who gain access to this volume to absorb the extra costs of supplying small volumes of specially sorted products to their remanufacturing partners and still earn a satisfactory profit margin. This is the sense in which the 16.1 programme might be regarded as providing a subsidy to those in the remanufacturing sector with such agreements.

However, given the objectives of the 16.1 programme to promote the secondary industry through facilitating access to raw materials, some majors suggested that a direct approach might be better. One proposal was to return the quota to the majors on the condition that a certain volume of their output went to secondary manufacturers. One advantage of this from their perspective was to avoid the effective removal of timber from the AAC during the transition period while a new venture which had been awarded a bid proposal sale got its facilities up and running.

With respect to the Commission's proposals on timber allocation, the large mills were not any more optimistic about their potential to survive than anyone else. From their perspective, it is felt that there would be too much insecurity and that their shareholders might have less inclination to wait out the inevitable shakedown than the owners of local firms. From the perspective of nonintegrated firms, it is felt that the disadvantages of oligopsonistic chip prices would be exacerbated and they would not be competing on a level playing field even if their quota ratios were approximately the same. There was general agreement that, by itself, competition would not produce more investment in value added. It was, however, also agreed that the next generation of sawmills in the Interior was likely to more flexible and somewhat smaller, but that this would be the result of product market factors.

The traditional suppliers of the Interior remanufacturing industry have been the small independent primary processors who rely mainly on Category 2 sales for their survival. Once typical of the sawmill sector in the Interior, they were probably saved from extinction by the introduction of the small business programme a decade ago. This sector of the industry has traditionally been least organized because it has been most independent and truly representative of the virtues so often associated with the entrepreneurial competitive spirit. In 1987, with changes to the SBEP in the wind - changes that eventually resulted in the introduction of the new programme on bid proposal sales - many of these operators, mainly located in the southern Interior, formed themselves into the *Interior Category 2 Wood Processors Association.*

Although it is part of their philosophy that they would like a true totally competitive market for timber, they consider that under the conditions recommended by the Commission they would be disadvantaged since they would not only lose their special category, but would also be competing from a base of zero quota against those with up to 50 percent of requirements. They do not argue that they are capable of processing timber more efficiently than the majors, but they do argue that they have a much greater incentive to produce the lumber required by the secondary sector. This is because their cost differential between producing dimension lumber and other sizes and grades is much less than that of the majors, and thus a much smaller premium in the selling price for these products is required to provide the economic incentive to produce them. They have the ability to be much more flexible than the large mills.

Category 2 sales are awarded on a competitive basis and yield an average stumpage price that is above appraised stumpage and probably above that paid under the bid proposal sales. In general, it is below the average price paid for Category 1 sales and thus few of the sales in the open category are won by Category 2 registrants in competition with category 1 registrants. Category 2 registrants process the timber from their sales, whereas most of the wood cut in Category 1 sales is processed by majors. These operators have consistently lobbied for a higher volume to be designated for Category 2 sales. They recognize there would be an economic cost in stumpage revenue foregone as compared to Category 1 but believe that the cost is justified in order to achieve social goals of forest policy such as higher employment and the encouragement of a diversified, value-added sector. They point out that they are currently more labour intensive than the majors, and that their employment generating ability is further enhanced by the secondary remanufacturers who are the customers for a significant proportion of their output.

Their analysis of the 16.1 situation is that this amounts to a further policy bias in favour of major licensees since the timber ends up in their hands. They acknowledge it provides access to the lumber output of majors for secondary processors, but point out that this is, in effect, yet another case of the majors encroaching on their interests, in fact, on the one market which they have traditionally served.

Remanufacturers with Primary Breakdown Facilities

Those remanufacturers with their own primary breakdown facilities justify these on the grounds that it is the only way that they can obtain the particular input they require. They do not disagree with their critics who point out that their sawmills are not competitive with the larger mills and thus economically inefficient. Instead, they argue that this is a necessary cost of producing the quality raw material required to achieve a high value added end product. Since they have there own primary facilities, these operators do not have supply agreements with the majors associated with 16.1 sales they hold and, thus, do their own logging. In general, they follow a European model for their operations as well as targeting European markets for their products. This involves starting the process of adding value in the woods and continuing in a sawmill with the flexibility and quality control necessary to produce a product appropriate for conversion to its eventual end use. Such facilities are the epitome of the high quality, further manufactured sector that most British Columbians would like to see established in their province.

It is unlikely these operators could survive in open competition. Even under the present 16.1 system current stumpage is too high for them. This may not be a fair reflection of their economic viability, however, because of the comparative value system used to calculate stumpage.

COAST

HIGHER VALUED PRODUCTS AND MARKETS

Adding Value in Primary Breakdown

Both the products and markets of the coastal primary processors are more diverse than in the Interior. There has always been some degree of specialization among coastal producers either in terms of species, or markets, or both. This reflects the far greater heterogeneity in species, size and quality found in coastal timber. Thus, there is great emphasis on the necessity of sorting at all stages in the production chain.

Historically the log profile of the coastal harvest was biased towards Douglas-fir. This reflected market preferences. The large number of cedar specialty mills is a traditional example of species segregation that still continues. Specialization, in this case, is related to the physical attributes of the wood both with respect to processing requirements and the type of products for which it is best suited. Mill specialization in other species such as hemlock has, in contrast, arisen mainly because of market preferences concerning such qualities as colour and grain. The development of hemlock as a desirable species was an example of proactive marketing in the search for higher values.

Specialization in species has promoted log trading. The ability to trade logs has been enhanced by the geographic features of the Coast. Most processing is done either on Vancouver Island or the lower mainland and the logs are transported there by water. Although most of the log trading is based on log for log exchanges there are opportunities for primary processors without timber to purchase logs on this market.

The need to be proactive in seeking out markets for specialty items is emphasized by all in the industry. Market information has value in such markets, in contrast to commodity markets where information has zero price because it is equally accessible to all. In the search for added value, information is as valuable in the log market as any other market and adds another barrier, in addition to those of scale and lack of logs to trade, for small processors seeking logs.

Following a period in which the coastal primary processing sector focussed its efforts on feeding the huge U.S. demand for dimension lumber, the industry has been restructuring to build markets offshore. There are several mills which have been built exclusively to serve Japanese lumber market. In order to be able to supply a product other than cants (baby squares for example), a good deal of flexibility is required. This is the attribute which is now central to mill design as it offers the potential to respond to diverse market requirements. Thus, it is in the primary breakdown, value added sector that some people see the greatest potential for growth.

The opportunities described above are clearly open to large integrated mills. However, it was pointed out that there may be other obstacles to such firms realizing this potential. First, as noted above, accessing capital for small projects in large corporations may present problems. Second, effective lines of communication between decision makers concerned with processing and those seeking out and dealing with customers may be difficult to achieve in large integrated corporations. It was pointed out that marketing requires a different corporate philosophy to the engineering or process oriented approach required for volume based commodity production. Attention to detail and the "personal touch" is more valuable than speed. Commodity products are "sold" not "marketed".

Adding Value in Remanufactured Products

There was some suggestion that British Columbia may have already reached its limit in remanufacturing capacity relative to accessible market size. These perceptions vary depending on whether the perspective is the cost competitiveness of British Columbia producers or total market size. Part of the concern is that new producers, attracted by the bid proposal program, may not actually be expanding British Columbia participation in further manufacturing but simply displacing existing operators.

There was also the suggestion that the major part of the production of the present remanufacturing industry could actually be integrated into specialty sawmilling. In spite of the associated emphasis on specialty niche markets, this view was held by both a small mill and a major non-integrated tenure holder.

On the Coast, it would appear that a sizable proportion of the output of the remanufacturing sector is custom work.

INPUT COSTS AND AVAILABILITY

Capital

Although the importance of secure timber supplies for gaining access to capital was not disputed, it was not universally accepted that timber supply should be used as a mechanism for this purpose. This was in contrast to the Interior where almost everyone seemed to believe that they needed the security of some type of quota. Funds such as the recently announced Venture Capital Equity Fund were suggested as alternatives. It was, in fact, suggested that delinking appurtenant processing facilities from some existing licences would free up capacity, presently being operated inefficiently, more effectively than removing quota and associated management responsibilities from current tenure holders.

An additional reason given for the reluctance of integrated firms to allocate funds to remanufacturing projects was other demands on their financial resources, such as requirements to upgrade pollution control capability in pulp mills.

Labour

There was considerable concern expressed by independent remanufacturers that it was becoming increasingly difficult for them to be cost competitive with rivals operating a short distance away, south of the border, with lower wage rates. Many feel that there is an increasing trend for British Columbia firms to relocate there.

TECHNOLOGY TYPE AND AVAILABILITY

The wider quality spectrum in Coastal timber provides higher premiums which, in turn, have the potential to encourage larger mills to be flexible and invest the extra cost in selecting for quality. There is also an incentive for smaller, primary processors to focus production on the higher end of the market. This suggests there may be a range in scale for economically efficient specialty sawmills on the Coast. The main attributes required are a willingness and the technical ability to be flexible, a disposition to sort and sort again to get the highest quality and knowledge of the markets available. An important constraint on large firms in this regard is that they have become increasingly integrated into pulp and still retain a commodity producing mentality in lumber. In some firms philosophies are changing but ingrained attitudes are difficult to overcome in large organizations.

TIMBER ACCESS

Primary Breakdown Remanufacturers

A high proportion of the value added activity occurring in British Columbia is in primary breakdown sawmills. A few of these are integrated with remanufacturing plants. In the Interior, there is little to differentiate the sawmills of integrated pulp firms from those of the unintegrated independents in terms of products, markets or proportion of captive timber. In contrast, the coastal integrated pulp firms have both more secure access to timber in the form of TFLs, compared to FLs, and a higher proportion of captive timber. In addition, there is much greater size diversity among Coastal sawmills. As pointed out earlier, following the recession of the early 1980s, most coastal firms reduced shipments to the U.S. dimension market and built new more flexible sawmilling capacity. There are some mills which are still specialized and thus constrained in terms of log size and species cut, but most coastal mills share an ability to adjust output in response to market preferences. They thus have the necessary prerequisite for value-added production.

There is a sizable proportion of primary processing capacity on the Coast with little or no dependence on long-term tenures. These mills would, presumably, benefit from any increase in market timber availability and this sector could grow. Whether any additional output from this source would be relatively more highly valued or more accessible to the further manufacturing sector is impossible to predict.

On the other hand, the Commission's proposals would impact very differently, in terms of timber security, on the integrated pulp firms compared to the larger, non-integrated lumber producers. The specialized approach to marketing and production required for higher valued products is very different to that for a commodity product such as pulp. Thus, it may be better achieved by a non-integrated firm. Under the Commission's recommendations such firms would be penalized relative to their integrated rivals. It was suggested to us that the pulp side of integrated firms is viewed by most of them as more important, and further, that the much larger capital investment associated with pulp mills was a major factor in the desire for security of tenure. Since, however, reduction in their primary sawmill capacity would result in reduction in tenure, one reason for retaining sawmill capacity, even though it is not as efficient as it might be, is to avoid tenure losses.

Thus, it would appear that the reduction in quota resulting from the Commission's recommendations would come from that sector of the major industry most committed to higher valued production and would leave them further disadvantaged compared to their more secure integrated rivals. The justification for quota given by the larger lumber firms are the benefits of log sorting as a prerequisite to adding value. It was pointed out that when the sorting was done internally by the firm, the costs associated with market transactions were avoided.

Remanufacturers Without Primary Breakdown Facilities

For established remanufacturers on the Coast, the disadvantages associated with the actual implementation of bid proposal sales tends to outweigh the associated advantages. This is because very few existing processors have received such sales. There is a general feeling that many successful bids had been too optimistic and were unlikely to come to successful fruition. In the meantime, they resulted in reductions in available timber for primary processors and also in available raw material for the secondary sector. In the lower mainland, where a high proportion of further manufacturing plants are located, access to raw material appears to be a minor consideration compared to other operational costs, especially when compared to rivals a few miles south across the border in the United States.

Although we did not meet with more remote small Coastal operators, we reviewed the research done in Region One concerning access to raw material. The problems expressed seemed similar to those we encountered in the Southern Interior. The raw material is available but there are additional costs associated with market size and market information as well as the cost of sorting for the specific materials required. One suggested solution in Region One, is to use computer sourcing to match demand requirements with available supply.

There is not the same problem with the output profile of coastal primary producers as there is with the output of dimension mills in the Interior. This is one reason why coastal firms appear to have far fewer supply agreements or joint ventures with holders of 16.1 sales. The only one we encountered involved timber logged by an interior division of a major firm with the lumber exchanged coming from one of its coastal mills. However, there does seem to be a significant amount of custom remanufacturing on the Coast as well as the use of custom facilities such as dry kilns. Major firms are also finding other ways to cooperate with smaller value-added processors, ranging from log exchanges or sales to taking an equity position in the firm.

On the other hand, there does seem to be a timber access problem for small primary processors in Region One as well as a lumber access problem for further manufacturers. One suggested solution was to have Category 2 sales, as in the Interior.

Overall, there was no indication that a more competitive timber market would ease raw material availability problems for remanufacturers on the Coast by preferentially benefitting those most likely to supply them at an affordable price.

Remanufacturers with Primary Breakdown Facilities

The coastal firm we met which has both primary breakdown and remanufacturing facilities differed in several respects from its interior counterparts. The sawmill was not specifically designed to provide suitable material for the remanufacturing facility. In addition, the 16.1 sale held by the coastal firm represents a relatively small proportion of its total timber requirements, the remainder of which is purchased on the Vancouver log market. This firm has been competitive in accessing market logs and believes that a larger market would enable the entry of more such firms, especially if the larger Coastal capacity was reduced by relaxing the appurtenant mill requirements for major tenure holders. However, this particular firm is in a unique position as the single largest purchaser of logs on the Vancouver log market. There are other small coastal remanufacturers integrated into primary processing whose sawmills are designed specifically around their value-added requirements. In these cases, there do seem to be timber access problems, but it is difficult to determine the extent to which a larger log market would be of assistance.

CONCLUSIONS

This study was designed to address three specific questions (page 2 of this report) concerning the impacts on the structure and product mix of the solid wood products industry in British Columbia of the "creation of competitive timber markets". Before attempting to answer these questions, some qualifications are necessary.

A perfectly competitive market is one in which neither the buyer nor seller can influence the market price; each participant has perfect market knowledge and there are no barriers to either entry or exit. The timber markets which would result from the Forest Resource Commission's recommendations fall far short of this ideal.

As described earlier, under the Commission's proposals, current holders of long term harvesting rights will be allowed to retain, in part, their exclusive access to Crown timber. The impact of these recommendations differs by Coast and Interior. On the Coast, a far greater proportion of the AAC is committed to Tree Farm Licences. Furthermore, with one major exception, coastal Tree Farm Licence holders are integrated sawnwood-pulp firms. In contrast, in the Interior, the most common form of major tenure is the volume-based Forest Licence and existing Tree Farm Licences are much smaller than on the Coast. Furthermore, there are several major interior lumber producing firms which are not integrated into pulp and yet hold licensed cutting rights to timber which provide them with a ratio of timber rights to processing capacity similar to those for integrated firms. We estimate that, under the proposed changes in timber allocation procedures, approximately 60 per cent of the coastal AAC would remain under the exclusive control of major licensees while in the Interior this proportion would be less than 40 per cent.

The Commission's report leaves moot the question of whether the competitive timber markets envisaged will be log markets or markets for standing timber. This question is clearly an important one which will not be addressed here except to note that, as pointed out earlier in this report, adding value to timber products starts in the forest. In this respect, stumpage markets would be preferred in that they would promote integration between harvesting and manufacturing.

Hypothesis One

> ***The creation of competitive timber markets is a key to reshaping the structure of the forest industry.***

The creation of timber markets, as proposed by the Forest Resources Commission, would have an impact on the structure of the forest industry. However, whether these changes would be compatible with public objectives for the Province's forest resources is questionable.

In the Interior, the AAC currently allocated to major tenures satisfies only about 75 per cent of their solid wood processing capacity, based on 2 shifts per day. Indeed the requirements of these major licensees actually exceed the total AAC available in the region. This has resulted in increasing competition among the large Interior mills for market supplies of timber from Category 1 small business sales, section 16.1 sales (through exchange agreements i.e., lumber for logs) and also on timber from the limited area of unmanaged private forest land held, mainly, by small owners. Given the situation of overcapacity, a transition to a different industry structure is inevitable. The question is whether the Commission's recommendations would be the best way of managing the transition.

Stripped of a substantial proportion of their captive timber supplies, major companies with large scale saw mills, or integrated operations, would compete vigorously for market supplies. In order to compete successfully in the market place, large, capital intensive, Interior sawmills have a high minimum operating level. Operating rates below this level can not be sustained for very long before a mill is forced to shut down. Survival, therefore, will depend on being successful in the market place and prices will be bid up. Firms with pulp capacity will be at an advantage in that they are able to capture the full economic value of sawmill residues. There will be market casualties and some mills will be closed down reducing industrial capacity.

Independent, specialty sawmills who hold Forest Licences would lose a substantial proportion of their secure timber supplies and would have difficulties competing in the market place for the shortfall. Small saw mills, which currently depend on category 2 sales, would be disadvantaged by their lack of secure timber supplies and capital reserves available to the major companies. They cannot compete against the modern, high-tech mills of the majors in the production of dimension lumber. Their advantage lies in greater flexibility which allows them to produce a variety of products for local use and for remanufacture. However, the values available to them in these markets, their small scale, the fact that many of them do not have the facilities to produce pulp chips, and their lack of access to capital for up-grading, suggest that they would not be able to outbid their larger competitors for limited timber supplies and that many would be forced to close down.

Lumber remanufacturers and secondary manufacturers, particularly in the southern Interior, would suffer some reductions in their raw material supplies if small sawmilling capacity was reduced. Non-integrated remanufacturers and secondary processors with Section 16.1 timber sales might be better off, in that their ability to negotiate exchange agreements with major sawmills might be strengthened. However, those with no access to standing timber would find it no easier to access their raw material supplies.

The net result would probably be a more concentrated primary processing sector and a relatively smaller independent further manufacturing sector. The competitive structure would be more economically efficient in that returns to the resource, in the form of economic rents, would be maximized and these returns would be captured by the Crown. However, the transition would be painful in terms of industrial dislocation and other social goals for the resource, including employment and community stability, would not be well served. In the Interior, the market solution would result in an uncontrolled transition rather than a managed transition to a reshaped structure.

The situation on the Coast, as already pointed out, is very different to the Interior. The timber resource provides greater potential for the manufacture of higher value end products and the industry is already exploiting the opportunities to a much greater degree. Under the Forest Resources Commission's proposals, the large integrated firms on the Coast would retain a much higher proportion of their captive Crown timber supplies than their Interior counterparts. Since it is not known how much these firms rely on their captive tenure for raw material for pulp mills, it is uncertain what sawlog requirements they would be seeking in a competitive timber market. There does not seem to be the same differences in economic efficiency related to scale as in the Interior and mills are more flexible in terms of their product and volume requirements. Thus, while competition for increased market supplies would be intense, smaller mills cutting a variety of grades and sizes would be able to compete and this segment of the industry would probably grow proportionately. Further, if Tree Farm Licence holders were released from the requirement that they maintain sawmilling capacity (a recommendation not made by the Commission) some integrated firms might reduce the sawmill side of their business and there would be a rationalization of primary breakdown capacity. Some mills would be closed down, with associated community disruptions, others sold and a higher proportion of logs would be placed on the market.

A higher volume of timber entering competitive markets would have no direct impact on independent remanufacturers and secondary processors. As will be seen below, the future of this segment of the industry depends on a number of other factors.

In summary, more competitive coastal timber markets are a necessary, but probably not sufficient, condition to help drive the sawmilling industry towards rationalization resulting in greater efficiency and the generation of higher economic rents. In contrast to the Interior, concentration of control over primary breakdown capacity might be reduced and the proportion of small to medium sized independent mills increased. The changes would have little impact on the independent remanufacturing and secondary processing sectors.

Hypothesis Two

> ***A major barrier to the establishment of smaller scale, regionally owned and operated manufacturing plants is timber availability.***

This question will be addressed in two parts. First, with respect to small scale primary sawmills and, second, with respect to independent remanufacturing and secondary wood processing plants.

In the Interior, although small independent category 2 sawmillers might claim that timber availability is a constraint on the growth and prosperity of the sector, their concern is that too much of the allowable cut is committed to major operators (which they might define as anyone larger than themselves). Their solution to this problem is twofold. First, they would like to see more of the SBFEP AAC allocated to Category 2 sales, second, they would like to have a degree of timber supply security comparable to that of the major tenure holders. This latter measure would help to solve one of their most pressing problems - access to capital. The "problem" they face, therefore, is not so much one of timber availability but a more secure, greater supply of timber *available at the right price*. As indicated above, these smaller firms could not compete with the owners of large scale, high tech., dimension lumber mills in a competitive timber market. In the type of market which would result from the Forest Resources Commission's recommendations it is their belief that they would be decimated and we agree with them.

Interior specialty sawmills, smaller than the dimension mills but larger than Category 2 plants, would be in a similar position. Some of these are eligible for section 16.1 sales and see the provision of more timber in this type of protected category as important for their survival.

Independent, non-integrated sawmills on the Coast largely rely on the Vancouver Log Market for raw material supplies. They compete here for available supplies and would be the major beneficiaries of increased market supplies, provided there was continued protection from the global log market. On the Coast, it would be correct to say that this sector is constrained by timber availability and that a higher volume log market would improve access to the industry and help the most efficient firms to grow and prosper.

Turning now to the independent remanufacturers and secondary processors whose raw material requirements are lumber, not logs or standing timber. Again, the question is not a simple one of raw material availability but, rather, availability at a price manufacturers can afford. The ultimate value that can be added to the resource is determined by the market place. The ability of producers to add value depends on their ability to do it at an incremental cost which is no greater than the additional value realized. The amount they can afford to pay for raw material is equal to the revenue that the volume in question would realize in the market place less all the costs, including an adequate profit margin, of processing and marketing it. Lumber is available for remanufacture both in the Interior and on the Coast provided the buyers are willing to pay the market price, which includes a premium for making the material available in the form (species, grades, sizes and quantities) desired. In the Interior, as we have seen, these premiums can be considerable and place the price of the material beyond the further manufacturers' ability to pay. On the Coast, this problem is less acute, but, as in the Interior, further manufacturers face many other problems which reduce their ability to compete as buyers in lumber markets.

British Columbia producers of further manufactured products are at a cost disadvantage arising from their location. For the generic items sold in North America, distance from markets presents problems in terms of transportation costs and consumer service. For custom goods in Japan and Europe, distance translates into a type of transaction cost arising from the need to understand market requirements in terms of products and service and the development of market niches and consumer confidence. Secondary manufacturers and many remanufacturers do not sell their products, in the sense that commodity lumber is sold into competitive markets, rather they have to market them in ways which add considerably to their costs.

Independent, further manufacturers also face problems of access to capital. Small businesses face such problems in all sectors, however, in the production of further manufactured wood products these are exacerbated by chronic uncertainty in the raw material markets they rely on. Without some security of raw material supply, the necessary capital for the establishment, or expansion, of a manufacturing plant is difficult to obtain (this is one reason why the intent of the Section 16.1 sales is generally supported by the further manufacturing industry).

Generally speaking, the more highly manufactured a wood product, the greater the importance of labour in its total production cost. British Columbia producers face higher labour costs than their American counterparts which explains, together with lower land costs, capital costs, and taxes in the United States, why so many firms in the industry have relocated, or are contemplating relocating, south of the border.

In summary, timber availability is an oversimplification of the many factors affecting the establishment and growth potential of smaller scale, regionally owned and operated wood manufacturing plants in British Columbia. With the possible exception of independent primary processors on the Coast, it is doubtful that more competitive timber (log or stumpage) markets would help this sector of the industry.

Hypothesis Three

> ***Relatively low, administratively determined stumpage prices have an impact on the industry's product mix pushing it towards lower value commodity products.***

As explained above, the major force driving a firm towards a certain product mix is the desire to maximize profits, or the difference between sales revenue and total production cost.

Many factors enter this decision. If a firm does not have to compete for timber, then the stumpage price, administratively determined, is one element of raw material cost and, as such, will help determine the firm's most profitable strategies in terms of product mix and choice of processing technology. There is no reason to believe, however, that if stumpage price is "relatively low" a firm will necessarily choose to manufacture low value products. What economic theory does imply is that a firm may be less frugal in its utilization of the resource. This would be reflected in the choice of technology and relative intensities of use of the various factor inputs. In B.C., for example, labour, is a relatively expensive input, it is still used to make commodity products but labour productivity rates are very high.

A firm's choice of output thus will depend on product values and *all* the costs associated with manufacturing and delivering them to the market. During the 1960s and 70s, for example, growth in the production of commodity dimension lumber in the Interior was largely the result of market opportunities presented by growing United States' import demand for such products, not by low stumpage prices. Economies of scale in production became feasible with growing demand and changing technology and firms were encouraged to pursue such economies by rising labour costs and a tenure system which guaranteed adequate wood supplies, thereby reducing uncertainty and improving access to capital markets.

If a firm must compete in a market place for timber, then its survival will depend on its ability to outbid its competitors. The amount it can bid is the residual found by subtracting all production costs, other than the cost of purchasing timber, from sales revenue. In such a market situation, each firm has a strong incentive to choose that product mix which maximizes its ability to compete for raw material. However, there is no reason why high value, further manufactured products will be chosen. For example, on the Coast, in the absence of restrictions on log exports, a firm might well find that the production of logs for export is its optimum competitive strategy.

In summary, competitive markets encourage economic efficiency and ensure that resource rents, captured by timber owners in the form of stumpage, are maximized. However, there is no reason to believe that maximizing returns to the resource will result in a "higher percentage of further manufactured products in the product mix". Adding value also means adding costs and will only be pursued if such a strategy improves *net returns* and, thus, enhances a firm's ability to compete in the market place.

The production of higher value wood products is traditionally associated with more labour intensive processes which provide more jobs per cubic metre of raw material processed. Increasing employment within the forest products sector may be a perfectly legitimate public goal. However, increased economic efficiency and increased employment opportunities are not complementary objectives, especially in a high wage, high standard of living economy like B.C. The trade offs involved must be explicitly recognized in public forest policy.

The product mix of the wood products industry is primarily driven by markets. In British Columbia, the further manufacturing industry is disadvantaged by location and high labour costs. Competitive markets for logs or stumpage would result in timber being allocated to those who enjoy a comparative advantages in product market access and manufacturing costs.

Since the last century, the primary processing industry in British Columbia has been protected through log export restrictions. This explicit industrial strategy has, undoubtedly, increased the size of the industry and the number of people employed and is still widely supported today. However, further growth in primary processing is limited by raw material supplies and the industry will probably shrink in size in the future as increasing demands are placed on the resource base. The importance of the industry as a source of jobs and community stability might be preserved by further processing solid wood products, however, explicit strategies designed to achieve this goal may be required. The policy initiatives proposed by the Forest Resources Commission will not serve this end and, indeed, may be counterproductive.

RECOMMENDATIONS

- In so far as questions surrounding timber supplies, their allocation to various industrial users and the structure of the forest industry are inexorably linked and affect the many benefits derived from the resource by the people of British Columbia, they should be dealt with in a coordinated manner in order to develop a comprehensive industrial strategy for the Province's forest products sector.

- In developing such an industrial strategy, it must be explicitly recognized that public goals for the forest industry: economic efficiency; higher value added; and increased employment opportunities, are not complementary. The trade-offs between these conflicting objectives must be understood and methods developed for evaluating them and achieving an acceptable balance between them.

- The timber supply and allocation requirements of the industrial strategy must be coordinated with an overall land use strategy for the Province's forests in order to facilitate the design of optimum tenures for comprehensive resource management purposes.

APPENDICES

APPENDIX ONE

Bid Proposal Sales Committee. 1991. *Report to the Minister of Forests.* B.C. Ministry of Forests, Victoria, B.C.

British Columbia Forest Resources Commission. 1991. *The Future of Our Forests.* Victoria, B.C.

British Columbia Ministry of Forests. 1978 (amended 1988). *Forest Act.* Revised Statutes Chapter 140. Victoria, B.C.

British Columbia Ministry of Forests. 1988 (amended 1991). *Forest Act* Regulation B.C. Reg. 265/88 Small Business Forest Enterprise Regulation. Victoria, B.C.

British Columbia Ministry of Forests. 1990. *Primary Timber Processing Facilities in British Columbia 1989.* Victoria, B.C.

British Columbia Minister of Regional and Economic Development. 1989. *Wood Supply for Specialty Mills.* Region One Forestry Task Force. Informat Services, Nanaimo, B.C.

British Columbia Minister of State for Vancouver Island/Coast. 1988. *Adding Value to B.C. Solid Wood Products.* Region One Forestry Task Force Symposium. Informat Services, Nanaimo., B.C.

B.C. Wood Specialties Group. 1991. *Members List.* Vancouver, B.C.

BC Wood Specialties Group. 1991. *Production and Value Analysis 1990.* Vancouver, B.C.

Cohen, David H. 1992. "Adding Value Incrementally: A Strategy to Enhance Solid Wood Exports to Japan." *Forest Products Journal.* Vol 42(2).

Council of Forest Industries of British Columbia (COFI). (Various years). *British Columbia Forest Industry Statistical Tables.* Vancouver, B.C.

Council of Forest Industries of British Columbia. 1979. *British Columbia Remanufacturing Industry Preliminary Data.* Economics, Statistics and Energy Department. Vancouver, B.C.

Council of Forest Industries of British Columbia. 1987. *Proposed Market Development Program for Secondary Manufactured Wood Products.* Vancouver, B.C.

Council of Forest Industries of British Columbia. 1988. *A Partnership that Works.* Executive Summary of Midterm Review of Cooperative Overseas Market Development Program (COMDP). Vancouver, B.C.

Council of Forest Industries of British Columbia. 1989. Press Release on Formation of Cooperative Industrial and Market Development Program (CIMDP). Vancouver, B.C.

Council of Forest Industries of British Columbia. 1990. *Wood Products Buyers' Guide*. Vancouver, B.C.

Council of Forest Industries of British Columbia. 1991. British Columbia *Forest Industry Fact Book*. Vancouver, B.C.

Deloitte Haskins & Sells/Carroll-Hatch (International) Ltd. 1988. *A Value Strategy for B.C. Solid Wood Products*. Report and Appendices. Canadian Department of Regional Industrial Expansion; British Columbia Ministry of Regional Development. Vancouver, B.C.

Forestry Canada. (Various years). *Selected Forestry Statistics Canada*. Economics and Statistics Directorate Information Report. Ottawa, Ontario.

Gillespie, David W. 1991. *Program Review: Small Business Forest Enterprise Program, Woodlot Program*. Report to the B.C. Minister of Forests. Victoria, B.C.

Independent Lumber Remanufacturers' Association. (Various years). *Membership Directory*. Langley, B.C.

Industry, Science and Technology Canada. 1989. *British Columbia Producers of Manufactured and Specialty Solid Wood Products - A Directory*. Industry Development Division, Vancouver, B.C.

Leitch, Jeanette. 1992. Unpublished Graduate Study Research. Faculty of Forestry, University of British Columbia.

McWilliams, Jim. 1991. *Profile of the B.C. Wood Products Value Added Sector*. FRDA report. Forintek Canada. Vancouver, B.C.

Meil, J.K. 1990. "Value-added Trends and Technology Feasibility Limits in Canadian Softwood Lumber Producing Regions." *The Forestry Chronicle*, 66(1).

Nawitka Resource Consultants. 1991. *Data on the Corporate Concentration of Harvesting Rights, Manufacturing Capacity and Ownership in the B.C. Forest Industry*. V. 5. B.C. Forest Resources Commission Background Papers. Victoria, B.C.

Nielson, R.W. 1986. *Technological Needs in Lumber Remanufacturing*. Forintek Canada Corp., Vancouver, B.C.

Nilsson, Sten. 1985. *An Analysis of the British Columbia Forest Sector around the Year 2000*. 2 volumes. Forest Economics and Policy Analysis Project, Vancouver, B.C.

Olivotto, G. 1987. *Finance for Silviculture in British Columbia*. M.Sc. Thesis. Faculty of Forestry, University of British Columbia.

Pearse, P.H. 1976. *Timber Rights and Forest Policy in British Columbia.* Report of the Royal Commission on Forest Resources of British Columbia. 2 volumes. Queen's Printer, Victoria, B.C.

Random Lengths. (Various years). *Yearbook.* Random Lengths Publications Inc., Eugene, Oregon.

Statistics Canada. (Various Years). *Manufacturing Industries of Canada.* Catalogue 31-203. Annual.

Statistics Canada (Various years). *Production, Shipments and Stocks on Hand of Lumber and Ties.* Catalogue 35-003. Monthly.

Statistics Canada. (Various Years). *Sawmills and Planing Mills and Shingle Mills.* Catalogue 35-204. Annual (discontinued).

Statistics Canada. (Various Years). *Wood Industries.* Catalogue 35-250B. Annual (discontinued).

Statistics Canada. 1991. *Canadian Forestry Statistics* 1988. Catalogue 25-202. Annual.

Statistics Canada. 1991. *Monthly Survey of Manufacturing.* Catalogue 31-001. Monthly.

Woodbridge, Reed and Associates Ltd. 1984. *Secondary Manufactured Solid Wood Products in B.C.* Prepared for B.C. Ministry of Forests. Vancouver, B.C.

Woodbridge, Reed and Associates. 1988. *The Status and Direction of the Lumber Remanufacturing Sector in British Columbia.* FRDA Report 045. Vancouver, B.C.

APPENDIX TWO

List of Interviewees and the Firms and/or Organizations They Represent

A. Interior

Holders of major long-term tenures:

Mr Bob Lebeck, Sales Manager, Quesnel Laminators, Division of West Fraser Mills Ltd. Quesnel.

Mr. Ross Gorman, Gorman Brothers Ltd. Westbank

Mr. Gordon Steele, Riverside Forest Products, Lumby.

Holders of Section 16.1 sales with primary breakdown and/or further manufacturing facilities:

Mr. Pieter Byl, President, Scana Industries and Woodland Windows, Prince George.

Mr John Byl, Scana Industries and Woodland Windows, Prince George.

Mr. Bill McInnes, President, Prince George Precut Ltd, Prince George

Mr. Arnold Zwiers, President, Canadian Woodworks, Prince George

Mr G (Joe) Cerasa, President, C and C Wood Products, Quesnel.

Mr Dennis F. Powell, Abeda Wood Products, Winfield. President, Interior Value Added Wood Association.

Mr Gary Hill, General Manager, Milestone Wood Products Inc., Armstrong.

Mr Robert G. Bird, Plant Manager, Canwood Furniture Factory Inc, Penticton.

Remanufacturing facilities with no Crown timber allocations:

Mr. Rae Fujikawa, Managing Director, Okanagan Lumber Services Ltd. Enderby.

Holders of category 2 timber sales with primary breakdown facilities:

Mr Andy Raab, Penticton Automatic (Mill Division), Oyama; President, Interior Category 2 Wood Processors Association.

Mr. Dan Clark, Oyama Forest Products, Oyama.

Mr. Ed Tarasewich, Kal-Pine Products and Log Homes.

Other:

Mr. John Marritt, Interior Lumber Manufacturers Association, Kelowna.

B. Coast

Holders of long term major tenures:

Mr. J. D. (Des) Getz, Group Vice President, Coast Wood Products, Fletcher Challenge Canada, Vancouver.

Mr. J. A. (Jim) Shields, General Manager (Marketing), Coast Wood Products, Fletcher Challenge Canada, Vancouver.

Mr. J. D. (Jim) Chisholm, Manager, North American Industrial Sales, Lumber Marketing, MacMillan Bloedel Ltd., Vancouver

Mr. David Kyle, Manager, Lumber Marketing and Product Development, Weldwood of Canada Ltd., Vancouver.

Mr Bob Sitter, President, International Forest Products Ltd. Vancouver.

Mr. Fred Lowenberger, Vice President, Forest and Land Use, International Forest Products Ltd., Vancouver.

Holders of Section 16.1 sales with primary breakdown and/or further manufacturing facilities:

Mr. George L. Malpass, President, Primex Forest Products Ltd, Delta.

Mr. Shaun Sullivan, Vice President, Corporate Development, Primex Forest Products Ltd. Delta.

Mr. B. H. Blondal, President, Tyee Timber Products Ltd. Langley.

Mr. Trevor Buddo, Tyee Timber Ltd, Langley

Remanufacturing facilities with no Crown timber allocations:

Mr. Colin G. Harte, Uneeda Wood Products Ltd. Sardis. Chairman, Standing Committee Government/Industry Liaison, Independent Lumber Remanufacturers Association.

Mr. James A. Gillis, President, Haida Forest Products Ltd., Burnaby. [associated with primary Mill and Timber, a primary breakdown firm with small tenure]

Mr. Sawarne Sangara, Sawarne Lumber Co. Ltd., Richmond.

Others:

Mr K. J. (Ken) McClelland, Manager, B.C. Wood Specialties Group. Vancouver.

Mr. W. G. Bill Howard, Manager, Small Business Program, Timber Harvesting Branch, B.C. Ministry of Forests, Victoria.

THE FUTURE USE AND VALUE OF THE BRITISH COLUMBIA FORESTS

A Report for:

BRITISH COLUMBIA FOREST
RESOURCES COMMISSION

March 1992

EXECUTIVE SUMMARY

For the last 2 years, the British Columbia Forest Resources Commission has been studying the current status and future use of the forest resources of the Province. The Ministry of Forests, business leaders, politicians, and the public believe that new practices are needed to enhance the future economic worth of the resource; the timber and related industries strongly support the established business practices and contractual relationships.

SRI International, on behalf of the Commission, was asked to undertake an objective assessment of the forest resources and practices of the Province and to establish whether fundamental changes are required. In this assessment SRI:

- Analyzed the timber resource to determine its current value
- Evaluated alternative structures conducive to capturing a higher but fairer return on the forest assets
- Examined the costs and benefits associated with enhanced stewardship of the forests
- Provided an overview of the competitive marketplace

VALUATION OF THE PROVINCE'S TIMBER RESOURCES

Any valuation of the Province's timber resources must take into account who the stakeholders are and how considerations of stumpage as residual, use of an administered system, competitive bidding, costs of non-industrial uses, and cost of forest renewal affect the valuation. The method used to estimate the value of the resource must balance the conflicting views of the stakeholders and allocate the costs and benefits of the resource fairly among them.

Considerations in the Valuation Process

Stakeholders view value differently. Three groups of stakeholders are concerned with the disposition of forest resources: the owners of the resource (i.e., Provincial citizens), the "transformers" of the resource (i.e., the forest products industry), and the buyers or consumers of products manufactured from the resource.

Each stakeholder views the value of the resource differently. In general, owners are concerned with receiving a fair value in exchange for use of their raw material assets. They would like to compute the value as the present value of expected future benefits, less the costs of maintaining and renewing the assets. The transformers view the value of the raw material as a residual, that is, the value remaining after the asset is sold to consumers, less the costs of processing and transporting it, plus a fair return on their capital employed in the process. Consumers value the products of the resource based on quality and availability. The fact that membership in these groups often overlaps, as do the benefits accruing to each group, adds to the complexity of valuation.

Stumpage as a residual lowers value. Viewing stumpage as a residual leads to a lower valuation of the resource and structural inefficiencies in the industry. Since all costs are deducted before the residual is paid back to the owner, there is no incentive for costs to be contained. Price Waterhouse 1990 statistics show that employee compensation in the forest industry is one-third higher than the average in the Province and in the country and that productivity is not increasing as fast as compensation. The true value of the resource should not be related to industry inefficiencies or rates of productivity.

An administered system distorts value. An administered pricing system distorts the value of the resource–sometimes in favor of industry and sometimes in favor of government. An administered system setting lower rates provides stability and can keep domestic companies competitive in the global market. The same system setting higher rates could encourage improved productivity, investment in more efficient technology, and production of higher-value-added products, but it also discourages the smaller operators and leads to an industry with fewer and larger players.

Competitive bidding increases value. The introduction of competitive bidding would increase the value of the resource. However, higher value must be weighed against the social benefits and objectives of the Crown, which could suffer from competitive bidding.

Costs of non-industrial uses. The opportunity costs of non-industrial uses need to be factored in to any valuation of the resource. They include the "positive costs" of investment in recreational facilities and infrastructure, forest maintenance, reforestation, and employment, and the "negative costs" of restructuring the industry with loss of forest industry jobs and revenue.

Cost of forest renewal. Costs for forest renewal must be factored into its value for all uses and must be paid by all stakeholders, including non-industrial users.

Estimated Value of the Forest Resource

The method used to estimate the value of the Province's forest resources is based on measuring the benefits produced (or required) from using the forest resource for the owners of the asset and determining the capital required to duplicate the monetary value of those benefits. If the sole benefits are the direct and indirect payments made by the forest industry to the Crown, net of forest renewal costs, the total value of the resource can be determined by using the following formula for value:

Total value = Cash flow/discount rate

According to Price Waterhouse, the total taxes and fees paid to all levels of government by the forest industry and its employees was $2.6 billion in 1990 and $2.8 billion in both 1989 and 1988. Using an inflation-adjusted discount rate of 6.73%, the total value of the timber resources was:

	With no silviculture costs	Minus silviculture costs
1988:	$41 billion	$36 billion
1989:	$42 billion	$37 billion
1990:	$38 billion	$33 billion

These values are realistic when compared to comparable resources valued in the United States and Tasmania. A more complete valuation of the resource will require a comprehensive land use plan that specifies areas for forest industry use and areas for alternative uses.

ALTERNATIVE STRUCTURES FOR CHARGING FOR FOREST USE

Historic Overview of the Province

Since 1865, the Crown has tried to balance private gain with public benefit in the management of their forest resources, employing a combination of licensing fees and stumpage.

Various methods for licensing were introduced over the years, including the timber sales licence for small volumes of timber in 1912, old temporary tenures (OTT) in 1914, the tree farm licence (TFL) and public sustained yield unit (PSYU) for larger volumes of timber in the 1940s, and the timber sale harvesting licence (TSHL) in the late 1960s. In 1978, the PSYU and TSHL evolved into the timber supply area (TSA) and forest licence (FL), respectively. However, these systems resulted in a concentration of cutting licences in the hands of a small number of large companies and the virtual elimination of competitive bidding.

Two stumpage systems were introduced, one prior to 1987 and the other from 1987 to the present. For several decades prior to 1987, there was a residual stumpage system based on a value of the resource after operating costs and allowance for risk and profit had been deducted from the selling price of the timber. The selling price was based on the price of lumber and chips in the interior of the Province and on the price of logs in Vancouver for the coastal forests.

The current system uses comparative value timber pricing. Average target rates are set by the Government based on the value of different manufactured products and costs for producing them in different timber cutting regions. These are further adjusted for fluctuations in lumber prices.

Current methods have resulted in noncompetitive pricing, with 10 companies controlling more than half the annual allowable cut on publicly held lands in TSAs. In addition, 33 TFLs account for 22% of the annual harvest. Eight-five percent of the allowable annual cut is subject to stumpage contracts.

Comparison to Other Pricing Structures

To help evaluate current and projected structures in the Province, the study looked at pricing structures in four other countries: the United States, New Zealand, Scandinavia, and Tasmania.

In the United States, the system is 100% competitive, after a minimum acceptable value is set by the Forest Service. This creates strong competitive markets but other measures may be required to meet Provincial goals of industry stability, encouragement of new and smaller businesses, or direct introduction of higher value activities.

In New Zealand, the Government has recently privatized the Forest Service and sold off timber assets in "logical blocks" to any bidder. No information is available on the basis used for accepting or rejecting bids. New Zealand shares many values with British Columbia, such as a strong tradition of public ownership, a tradition of providing wood for industry, few potential bidders, and strong political concern for mills in outlying areas. This alternative may be applicable in selected areas of the Province.

In Scandinavia, most of the timber land is in private hands and prices are negotiated jointly by the owners and industry. This system has limited applicability in the Province, primarily because of the different land ownership patterns.

In Tasmania, the existing administered tenure system is being reevaluated because it is poorly related to market forces. The option that is being recommended by the Centre for International Economics in Tasmania would combine administered pricing (60%) with competitive bidding (40%). The proposed system may have the greatest applicability to the Province because it maintains some industry stability while allowing some competitive free-play based on market conditions.

Proposed Changes in Structure of Provincial Pricing System

The Commission has recommended a major change in the tenure system: cutting a company's current secured tenure rights by 50% and offering the other 50% in the competitive market. This will potentially provide greater stumpage revenues over time by permitting market forces to operate, and to improve timber availability for medium and small companies, based on the ability to pay.

Analysis of this change has resulted in the following findings:

- The proposed tenure reallocation system provides stability, equity, and diversity of tenure
- Introduction of open competitive bidding is a reasonable step toward capturing full value of the resource, thereby assisting in the restructuring of the resource
- Significant economic readjustment will follow in the industry from this change
- The proposed system should be introduced gradually to avoid reducing market-responsive productive capacity in the forest industry, and the Government should help minimize economic impacts on rural communities
- Limited privatization should be considered
- Future resource management agreements should try to minimize disruption to the efficient vertically integrated processing operations

LAND USE PLAN, INVENTORY, AND SILVICULTURE ASSESSMENT

Before any significant changes in the timber tenure system are made, a land use plan, forest inventory, and silviculture assessment should be completed.

The land use plan will clearly delineate those areas in which timber harvesting will be the predominant, if not the exclusive, use and those areas that will be shifted to non-industrial and environmental uses. An updated inventory of forest resources should be taken, with attention to data on timber quality, since analysts project long-term increases in prices for higher grade logs and a decline in prices for low-grade logs, and to those areas suitable for growing successive crops of trees. With the timber inventory in hand, the allowable annual cuts in different Provincial regions can be made, future log prices estimated, and a more meaningful estimate of future stumpage revenues can be made.

Once both of these tasks are complete, the reinvestment required in silviculture for enhanced stewardship can be estimated. Many non-industry observers believe that companies holding forest or tree farm licences have made only minimal investments in silviculture. But a great impediment to industrial silviculture (beyond the basic forestry stage) is the uncertainty of tenure, which discourages the long-term investments required.

Based on data from the Ministry of Forests and the forest industry associations, the current weighted average private investment in silviculture is approximately \$2.60/m^3 of annual timber harvested; in addition, Provincial and Federal expenditures are approximately \$2.24/m^3. The Commission estimates that at least three times the recent silviculture expenditures to \$1 billion will be needed for enhanced stewardship. This includes restocking efforts, establishment of stand tending criteria, and R&D expenditures to provide data on growth and yield of forest resources. Attention will need to be focused on high and medium growth areas.

SRI estimates that a doubling of current investment levels is necessary, at a minimum, but that the proposed tripling in silviculture investment seems realistic, given the long-term goals for the multiple uses envisioned for the Province's forests.

GOVERNMENT'S ROLE

The Government in British Columbia has a dual role: sustaining the economic vitality of the Province and protecting the Province's forest resources for generations to come. To ensure a successful and close relationship with the forest industry, which is required in the Government's dual role, the Government needs to provide clear guidelines to industry about the timeframe in which the recommended changes in tenure and/or stumpage will take place. It needs to help industry upgrade and diversify the product mix for the international marketplace, and develop policies that stimulate industry investment in national and international marketing, product development, and distribution techniques that allow for greater production of value-added and higher value products.

The Commission is proposing changes in the tenure system, a use-prioritized land use plan, increased silviculture, and selling higher value end-use products to improve the long-term value of the forest and extract more financial and nonfinancial value for all the stakeholders. The Government could further these objectives by offering several incentives to different segments of industry:

- Creation of competitive bidding on a substantial portion of the annual commercial forest harvest
- Tax incentives and public funds to help develop and promote the higher value sector of forest products industry
- Tax abatement, stumpage-free timber, and other incentives for companies that enter higher value markets
- Joint efforts to help promote export of higher value products
- More industry cooperatives focused on targeted products and markets

- An administrative structure that promotes stability in the industry, with control over annual harvest, the log market, disbursal of public funds for silviculture, and related resource improvements

OVERVIEW OF THE COMPETITIVE MARKETPLACE

SRI undertook an overview of the competitive marketplace in order to add further perspective, as the Commission and other major players assist and encourage the industry to enter more aggressively into the value-added and higher value markets.

Traditionally, the forest products industry of British Columbia has been a volume-driven "marginal producer" of commodity products responsive to the supply demands of large industrial economies. The question being considered is whether the industry can and should gradually convert part of its productive capacity into cost-driven, higher value products responsive to new, unique niche markets.

This overview of the competitive marketplace looks at the outlook for the major forest products markets and indicates the challenges to the Province's future competitiveness in those markets. The overview covers the three basic market sectors: commodity products, such as softwood lumber, newsprint, and market pulp; value-added products, such as millwork and moulding, wood kitchen cabinets, furniture components, structural wood members, and reconstituted wood products; and higher value products, such as treated wood, panelling, industrial blanks, and white papers.

Conclusions

We believe that the British Columbia forest products industry should expand into appropriate value-added and higher value sectors. Movement into these product sectors could mean:

- Less susceptibility to cyclical instability and money market fluctuations
- Greater employment per unit of timber
- The requirement for high quality wood in specific finished products
- Use of species in less demand (i.e., alder, aspen)

However, given the long-term dominance of large vertically integrated companies, the relatively small domestic market, and intense competition, success in marketing higher value products will require focused market analyses and product identification and sustained capital investment. Return on investment may be slow and participation by established local companies or foreign partners with adequate resources may be required.

This effort requires immediate attention because timber producing areas in the U.S. are also moving into these market sectors. Development should be initiated in the immediate future, built incrementally, and developed in tandem with production and marketing efforts that have been initiated by established manufacturers and the Government.

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I INTRODUCTION AND PRIMARY FINDINGS

SRI International has been pleased to support the British Columbia Forest Resources Commission (the Commission) by conducting a management overview and valuation assessments. During this effort, we have worked closely with Commission staff, held meetings with Commission members, and with Commission facilitation met with the Provincial Ministry of Forests and numerous representatives of the Province's forest products industry – both large and small coastal operations, and interior producers. We have also been provided with insights by consultants who have worked with the Commission and other organizations.

Most of those we talked with indicated that rapid and dramatic actions – including those that apply to its geographic and production subcomponents, and its commercial resource base – are needed to maintain and improve the international competitiveness of the forest products industry. Such actions are crucial for generating the revenue the Province requires for monitoring resource utilization and for replenishing the forest resource for traditional commercial and other forest values.

We have sought to remain objective regarding controversy resulting from Commission recommendations over proposed changes in timber tenure policies, the introduction of a competitive log market, and an open bid system for the product harvested from the proposed new Resource Management Agreements. We concur with industry that some of the proposals in the Commission report would entail major changes and should thus require gradual implementation schedules. We also support the Commission's desire to help create a cost- and product-competitive industry that provides a stable economic base for the Province and generates the public revenues needed to maintain a high-quality forest resource for both commercial and public uses.

We believe all the affected parties realize that compromise is needed but that it will be difficult to achieve in the context of specific proposals that differ in tone or procedure from the recommendations in the Commission's report, especially with regard to changes in tenure. For example, the proposal for 50% reduction of annual allowable cut (AAC) for tenure holders and the purchase of the remainder of any annual requirement by bid in an open-market system would entail a major change in long-standing procedures. On the other hand, any new system once implemented could of course be changed, given competitive necessities in the international competitive market and public revenue requirements. Our review of alternative models developed in the United States, New Zealand, Sweden and Finland, and Australia indicates that such a proposal could be fine-tuned in response to such factors.

A major conclusion of our work is that, although priorities and values differ for commercial and noncommercial interests, any final determination should be made in the spirit of compromise. A "win/win" situation is possible for all interested parties if they are willing to be flexible in considering new ideas and procedures. Indeed, such a stance is essential if the industry is to survive in a period of changing societal and economic values. At the same time, the Province's high standard of living will continue to be directly related to the economic health of its forest products industry. The Commission and its staff should therefore work toward the successful design and implementation of mechanisms for achieving the expanded objectives for the forests in the Province.

To recapitulate, the Commission asked SRI to arrive at a value for the asset base of British Columbia's forests. We were also charged with examining policy and management structures that would be conducive to capturing a higher but fairer return on the forest assets so that more intensive integrated management for all forest values could be practiced. Lastly, we were asked to develop a general overview of the present and future competitiveness of the Province's forest industry.

Accordingly, we examined each of these items, and arrived at the following findings:

- We have addressed the issue of full value for commercial timber uses and the effects of the changing marketplace on its total value. In this context, we arrive at the following total value for the forest timber resource in each of the past 3 years – $41.1 billion in 1988, $41.6 billion in 1989, and $38 billion in 1990.
- The changes proposed in the tenure system and the establishment of a limited competitive bidding system are reasonable if it is assumed they will be implemented gradually and structured to allow for additional modifications.
- The estimate of increased silviculture costs amounting to three times current expenditures is realistic, if it is assumed that the land use plan developed reduces the forest land available for long-term commercial forestry and significantly increases public use of the forest for recreation and related activities.
- The British Columbia forest products industry is a major player in an increasingly internationalized and competitive marketplace. To continue to be a major player, all industry members and the Province should proceed steadily but cautiously into higher value market sectors.

II AN EVALUATION OF BRITISH COLUMBIA FOREST RESOURCES

Placing a value on the timber resources of British Columbia and determining a fair return for the owners of those resources is, as the Commission is well aware, problematic and entails both technical and political considerations. The forest products industry believes that these resources can only be valued by subtracting all the costs of providing end products (e.g., dimension lumber, wood pulp, newsprint) to purchasers in an open market. The value remaining, after a fair return for producers is factored in, is the "residual" to be paid in the form of stumpage to the owners of the resource. Another approach suggests that the income generated by the forest resources supports a level of capital equal to the value of the resource. By determining an appropriate return on this "capital," the revenue stream dictates the value of the underlying assets.

Critical review of these methods indicates that the industry's suggested valuation, without constraints on production costs, under certain circumstances could require the resource owners to *pay the industry* to extract the resources. With the other approach, it cannot be determined whether current income, which is largely derived from stumpage, is appropriate or not.

The economic benefits provided by the forest products industry can be and have been measured. Those benefits, however, entail costs. The critical question to answer then is, "Who pays which costs?" Stumpage is one means of allocating the costs and benefits derived from the forest resources.

ASSUMPTIONS

SRI's assumptions are outlined below:

- The traditional industry approach of valuing stumpage as a "residual" leads to lower valuation of the forest resource and encourages structural inefficiency.
  - When stumpage is considered as a residual, the trees are "worth" whatever is left after costs are subtracted from the market price of the end product. This approach results in an undervaluation when industry is inefficient or other costs are disproportionately higher than those of competitors (e.g., labor, transportation)
  - A low stumpage to keep industry competitive in the global market – encourages investment in lower value-added products which tend to be vulnerable to extreme market cycles and substitutability.
  - On the other hand, because the current approach is well-established, to minimize economic and social dislocation any procedural adjustments chosen should be instituted gradually, not abruptly.
- The forest needs to be valued for nonindustrial uses. If those uses are not valued, the opportunity costs of not logging the forests are not accounted for, and nonindustrial users are subsidized by conferring a free good. At this point,

the value of nonindustrial use could be equated with the opportunity costs resulting from withdrawals from commercial cultivation. New land use plans will allow for more specific comparable appraisals and determination of alternative use values.

- The costs of maintaining and restoring the forest should be factored into its value. Failing to account for such costs allows revenue from forest operations to be diverted to other nonforest-related uses (e.g., other government programs), whereas fully allocating such costs helps ensure the maintenance of the forest.
- The costs of "enhanced stewardship" and of renewal and management of the forest for future generations should be calculated so that intelligent choices can be made. *All* stakeholders should contribute to paying these costs.
  - The forest industry needs to operate at a level of efficiency that permits it to fully recover costs for silviculture/renewal.
  - Nonindustrial users should also pay full economic value for their use of the resource.
- To the maximum extent possible, revenues from forest use should be reinvested in economically sound silvicultural programs, and not transferred to the general revenue fund of the Province to be used for other purposes.
- The continued restructuring of the forest industry may result in loss of jobs in the forests, but this can be offset by job creation in value-added manufacturing, silviculture, and tourism. As a result, some residents of inland rural areas may have to relocate, while others may simply change the type of forest-based work that they may undertake.

PREVIOUS AND FUTURE VALUATION EFFORTS

SRI's observations about valuation efforts follow:

- Recent valuations based on needed revenues to generate target returns were circular, although they avoided the "residual" trap.
  - They assumed a revenue stream consisting largely of stumpage and used that stream to determine what stumpage should be.
  - Assumptions about the market value of logs were conjectural and erroneous with regard to the business cycle.
- Any system that does not allow for competitive bidding will inevitably result in suboptimal pricing and resource use.
  - Potential exists both for over- and under-charging the industry. Undercharging permits the use of valuable old growth as stock for low-value commodity products. Overcharging reduces the likelihood of participation by smaller operators and discourages investment by larger operators, and if continued long enough reduces international competitiveness.

  - Any future valuation can be tested by limited export of raw logs to establish a benchmark "market price."

- No suggestion has been made for valuing the forest industry itself. An ongoing evaluation might be undertaken in tandem with the development of the new land use plan to address the following questions:
  - What consequences would driving up economic rent have on the size of the industry and on Provincial employment, revenues, etc.?
  - Are there any alternatives to a fully diversified industry?

- Any future valuation of the forest industry must be premised upon industry diversification. It becomes increasingly apparent that the competitive international market, likely increases in the cost of fiber and increased silviculture costs mandate that the industry move into higher value, i.e., market-driven, products.

VALUATION OF THE TIMBER RESOURCES AND DEFINITIONS OF A FAIR RETURN FOR STAKEHOLDERS

Traditional models for valuing timber resources and determining a fair return for the owners of those resources are complicated by new, and often conflicting forces. Supply and demand for wood fiber products have been affected by the emergence of powerful multinational resource companies; of new materials and construction and manufacturing techniques; and of a growing international environmental movement. Moreover, policymakers should weigh the conflicting needs and values of diverse stakeholders.

Three categories of stakeholders are concerned with the disposition of the forest resources of British Columbia:

1. The owners of the resource (i.e., Provincial citizens)
2. The "transformers" of the resource (i.e., the forest products industry)
3. The buyers of products manufactured from the resource.

Constituents in each category have quite different perspectives on the value of timber resources. Owners, for example, are concerned with receiving a fair value in exchange for use of their raw material assets. Their best interests indicate that they should compute the value of the assets as the present value of expected future benefits, less the costs of maintaining and renewing the assets.

Transformers view the value of the raw material as a "residual", that is, the value remaining after end consumers have paid the transformers' cost of processing and selling the material, plus a fair return on the capital employed to provide value-adding processing.

Consumers of forest products are the ultimate arbiters of value. They value products according to perceived quality and availability. In today's increasingly global markets, consumers can easily affect the prices transformers receive for their products. Consequently, transformers are constrained in what they can afford to pay to acquire raw materials.

Benefits derived from sale of the asset are probably even more complex to assess than costs. Members of the constituent groups are not homogeneous; moreover, membership overlaps among the groups. For example, both environmentalists and rural timber industry workers are owners of the asset. Corporate transformers are the owners of the very nominal private timber resources in British Columbia, and all at some stage consume wood fiber products. But perhaps most significant is that revenues generated from the timber resources significantly contribute to general government revenues, providing funding for the full range of government programs in place of higher direct taxes.

Thus the Commission is as concerned with deciding how benefits derived from the forest resource should be allocated to stakeholders as in determining the value of the timber resource itself. Those benefits cannot exceed the value of the resource or its restorative capability without depleting its value for future generations. Increasing the benefits from the forest will require that its value be increased. The principal means for bringing this about are to improve the quantity and quality of the timber asset base through more intensive silviculture at the stand tending level. For this to occur, current revenues in the form of stumpage or economic rent must gradually rise, but only in response to market-driven forces.

SRI's Observations about the Valuation Process

Stumpage as a Residual

Adopting industry's view of stumpage as a residual can lead to a lower valuation of the forest resource and thus encourage structural inefficiencies. This approach implies that trees are worth whatever the industry can afford to pay after the demand for end product, cost of processing, and a fair return on the capital employed have been factored in. However, the actual value of a stand of timber is *not* related to cost inefficiencies in the industry that harvests it, to high-priced labor, to productivity declines, to risky capital structures, or to the revenues government needs to support spending in other areas. Allowing such issues to affect the cost of stumpage could result in paying industry to harvest the forest ("negative stumpage"), rather than receiving an optimal price for a valuable resource.

Current Administered System

Any quantifiable economic value of the stumpage system is greatly reduced by the lack of competitive bidding in establishing stumpage. The Province's current system relies on administrative procedures to set stumpage rates. SRI believes that any system that does not allow for sufficient competitive bidding tends to distort pricing and resource use – sometimes in favor of industry and sometimes in favor of government.

Although an administrative stumpage system provides stable raw materials costs for the forest industry, it also frequently results in either under- or over-charging for the resource. Undercharging to keep domestic companies "competitive" in the global market effectively subsidizes investment in lower value-added products. Higher stumpage, if not excessive, forces industry and labor to improve productivity, and encourages investment in more efficient processing equipment and technology and the production of higher value-added products. These are desired results given the increasing costs of employee compensation and benefits, which are significantly higher than the Canadian average, and productivity trends in the industry (see Table 1 and Figures 1 and 2). Finally, overcharging adversely affects the competitiveness of smaller operators and leads to an industry with fewer and larger players. Investment decisions may also be negatively affected by overcharging.

Table 1
FOREST INDUSTRY EMPLOYMENT COMPENSATION AND BENEFITS

	1988	1989	1990
Industry Costs			
Millions of dollars			
Compensation	3178	3451	3389
Employee benefits	816	953	986
Total cost	3994	4404	4375
Individual Employee Benefits			
Thousands of dollars			
Compensation	36.5	40.6	41.8
Benefits	9.4	11.2	12.2
Average per employee	45.9	51.8	54.0

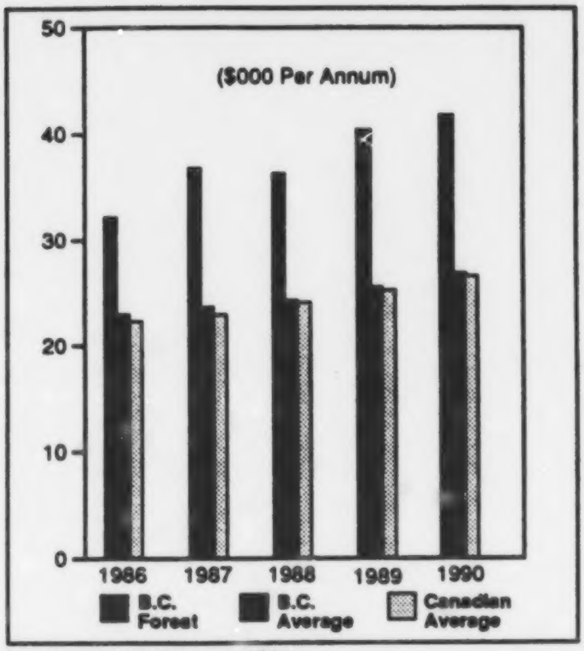
Source: Price Waterhouse, 1988-1990

Nonindustrial Uses of the Forest

Preserving or harvesting the forest are economic choices, and the economic value of the forest for non-industrial uses needs to be recognized. If the opportunity costs lost by not using the forest for industrial uses are unaccounted for, preservation appears to have no cost and the choice of that option is too easily made. On the other hand, if the benefits of selective withdrawal of portions of the commercial forest are ignored, the impact of systematic depletion of the forest could be underestimated. Benefits of conservation include the preservation of cultural heritage and natural beauty, which are difficult to quantify.

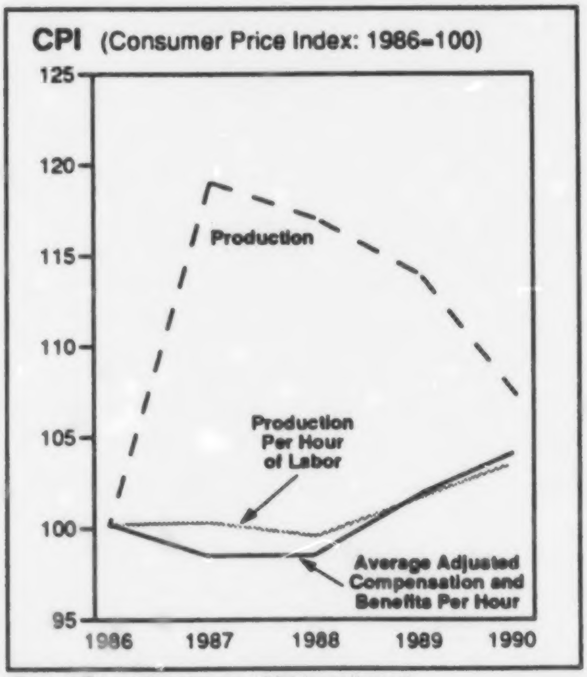
The opportunity costs of non-industrial uses of the forest are of two kinds:

1. "Positive costs" include increased public and private investment in expanding accessibility and recreational use options, maintenance of the forest and new infrastructure, management focused on enhancement of old-growth forests, reforestation in areas of heavy use, and new employment costs for the workers that manage the increased recreational uses.
2. The more obvious costs are "negative" ones associated with restructuring the industry. They include the possible reduction in high-paying forest industry jobs, the direct economic spin-off effects on smaller logging communities, and major reductions in tax revenues.



Source: Price Waterhouse, 1990

FIG. 1. AVERAGE EMPLOYEE COMPENSATION



Source: Price Waterhouse, 1990 (as adjusted)

FIG. 2. PRODUCTIVITY/COMPENSATION INDEX LUMBER MANUFACTURING

Both sets of costs point to the necessity of raising the value of the resource by diversifying the product mix, increasing productivity, and providing more intensive silviculture to improve resource yield in the commercial forest, whose land base may shrink owing to certain uses incompatible with industry objectives.

Nonetheless, a healthy viable commercial forest base must be maintained. If it is not, a great natural economic and natural resource will be lost along with jobs in the forest products industry and substantial revenues and taxes for local economies and governments. New jobs in silviculture and recreational use will be miniscule or nonexistent.

The Cost of Forest Renewal

To make informed choices, the cost of maintaining and replanting the forest should be factored into its value for all uses. Ignoring such costs can allow revenue from forest operations to be diverted to other public uses instead of reinvestment in economically sound silviculture programs.

All stakeholders have a price to pay. The forest industry needs to operate efficiently enough to recover the costs for silviculture/renewal. Nonindustrial users should also pay a fair economic price for their use of the forest resource. A user-pay policy in which appropriate forest revenues are retrieved to pay for forest renewal and stand tending should be encouraged.

Structural Adjustments in the Forest Industry

Since 1987, the industry has been held responsible for basic silviculture on its tenured land and has been subject to an administered stumpage system that has more than doubled government direct revenues from this source. This change in policy, along with environmental regulations and market dislocations, without doubt has already had a structural effect. Continued adjustments may well result in further job losses in the industry, offset to some extent by job creation in the silviculture and tourism industries and the production of higher value products. Such adjustments could lead to the possible relocation of many – particularly from interior rural areas. This issue is not a new one, however. Forest industry employment declined even in the banner year of 1989, as well as in 1990 (see Table 2). Nor is the trend an isolated one: the U.S. Pacific Northwest expects to lose between 25,000 to 100,000 timber jobs in the next decade.

Nonetheless, we believe that efficiency, competitive ability, and even employment could be enhanced in a restructured industry – one that supports enhanced stewardship of the forest resources and the silviculture jobs that go with it, provides a sufficient return to investors to attract needed capital, and realistically engages in higher value-added production. These objectives are ambitious, needless to say. A first step is achieving consensus about the discounted present value of the forest resource's future utilization.

A Balance Sheet Valuation

In estimating the value of the forest assets, one approach entails using a classic investment banking perspective; that is, revenues generated by the resource support a level of capital investment equal to the value of the resource. By establishing an appropriate return on this

Table 2
DIRECT FOREST EMPLOYMENT IN BRITISH COLUMBIA[a]

	1979	1980	1984	1985	1986	1987	1988	1989	1990
Lumber	52,000	49,500	44,000	40,000	29,300	29,000	28,500	28,100	26,900
Plywood					5,100	4,900	4,800	4,700	4,500
Market pulp	21,600	22,100	21,000	18,000	6,900	7,500	7,700	8,100	8,200
Newsprint					4,100	4,200	4,300	4,700	4,900
Logging	22,400	22,600	26,000	27,000	27,000	26,700	26,700	25,300	23,500
Other forest products operations					12,600	13,000	15,000	14,100	13,000
Total	96,000	94,200	91,000	85,000	85,000	85,300	87,000	85,000	81,000

Source: Statistics Canada

[a] Excludes most silviculture and lumber remanufacturing sector employees.

"capital" and making certain assumptions about the appropriate capital structure of the proposed Crown Forest Corporation, the revenue stream dictates a value of the forest assets at between $2.5 and $3.8 billion.

Such an approach is too limited, however. The value of the forest assets should at least approximate the price the owners would be willing to receive from industry "transformers" for the rights to exploit the assets. No one in government is likely to agree to part with the timber assets for such a small amount.

This approach produces such a low value because it primarily considers revenues from the sale of logs, and does not include revenues from finished and semifinished products. It uses a revenue stream consisting largely of stumpage to determine the value of the forest, whereas the Commission requires a valuation of *total timber resource* to establish stumpage representative of a fair return to the public.

A Full Economic Valuation Approach

The approach just discussed views the forest resource as a generator of revenues and seeks to determine the capital (a proxy for the value of the assets) needed to produce a required return from a projected revenue stream. That approach focuses on the value of the timber assets from the perspective of the forest products industry.

A more useful approach entails measuring the benefits produced (or required) from utilizing the forest resource for the owners of the asset, and determining the capital required to duplicate the monetary value of those benefits. In other words, what price would the owners charge for their timber assets? If that amount could be invested to ensure the desired stream of benefits, theoretically at least, owners would be indifferent about how the benefits are produced and would be willing to sell their ownership outright.

If we assume that the only benefits accruing to owners of the forest resource are direct and indirect payments made by the forest industry to government, and that those payments are net of forest renewal costs (responsibility for some silviculture was transferred to the industry in 1987), the total value of the resource can be determined by using the following formula for value:

Total value = Cash flow/discount rate

Because "enhanced stewardship" implies that the forest resources are renewable and intended for future generations as well as current consumption, the benefits derived from a monetary substitution should also be achievable in perpetuity.

According to the Price Waterhouse annual reports on the Province's forest industry, the total taxes and fees paid to all levels of government by the forest industry and its employees was $2.6 billion in 1990, and $2.8 billion in both 1989 and 1988. Using an inflation-adjusted discount rate of 6.73% [the Province's long-term debt cost of 11%, adjusted for a 4%/y inflation rate: (1.11/1.04) - 1 x 100], the total value of the timber resource was $41 billion in 1988, $42 billion in 1989, and $38 billion in 1990. (See Appendix B – Methodological Framing)

If we add historic silviculture costs of approximately $350 million as a fixed cost, the estimated value is reduced by approximately $5.2 billion each year resulting in the following reduced value: $36 billion in 1988, $37 billion in 1989, and $33 billion in 1990. It can be argued, however, that these costs are an investment in maintaining long-term value and should not be treated as an expense.

The estimated value for the timber resource for British Columbia is proportional to that developed in a study of the privately owned timber resource in the United States,* which is estimated to have a total value in excess of US$200 billion. The government of Tasmania undertook a similar analysis for its timber resource; the estimated value was slightly in excess of A$1.9 billion. The size of the asset in each of these other jurisdictions and the relative quality of the resource valued indicate that our valuation of the British Columbia resource is realistic.

Direct and indirect benefits provided by the forest industry are the most easily quantified. Other benefits that do not constrain the forest industry, when discounted appropriately, result in an even larger valuation. As noted, however, the value of benefits derived from the forest cannot exceed the value of the forest itself without depleting the resource base. How can it be ascertained whether excess benefits are being extracted to the detriment of sustaining the resource? And, even more problematic, what are the limits of the benefits that can be extracted without stifling industries that are producing benefits?

At present, in spite of the apparent unprofitability of the forest products industry, direct economic rent in the form of stumpage and licensing fees is not the primary cause of the industry's problems. Declining sales, the strong value of the Canadian dollar, and dramatically higher interest expenses are the most significant contributors to the industry's current lack of profitability. While payments to government have declined as a percentage of total industry expenses over the past 2 years, administratively set targets for stumpage are viewed as excessive in the context of today's market.

Ultimately, arriving at an optimal economic rent will be contingent on allowing markets for the timber resource uses to function more freely. Reallocations of resource use will affect costs and benefits; higher economic rent over time will also affect costs, demand, and benefits.

Resource use should be reallocated by instituting a new land use plan arrived at through open debate. Preserving resources results in lost revenues and should be recognized as an economic choice that can lead to reduced services or to higher taxes. At the same time, enhancing the value of the resource by ensuring that the optimal economic rent is charged will ultimately enhance the value of industries that exploit the resource by assuring their rationalization. Clearly, achieving both types of benefits will necessitate raising the value of the forest by optimal resource pricing and allocation; by open, competitive bidding by industrial users; by phasing out the forest resource as a "free good"; and by introducing reasonable user fees and sustained resource management practices.

FINDINGS AND RECOMMENDATIONS

Following our assessment of the valuation process, our valuation of the resource and the acknowledged need to "drive" value (i.e., identify factors that will influence and enhance the value of the forest), we offer the following set of findings and recommendations:

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*James A. Rinehart and Paul S. Saint-Pierre (1991). "Timberland: An Industry, Investment, and Business Overview." (San Francisco: Pension Realty Advisors) – a report for The Hancock Timber Resource Group

Findings

- A value for timber resources that is based solely on the economic rent derived from timber harvest cash flows is narrowly defined. Imputed value for major alternative uses (i.e., recreation, tourism, commerce) will evolve out of the land use planning process. Our valuation methodology and estimated value – $38 billion in 1990 exclusive of silviculture cost – provide estimated aggregate value for commercial use of the timber resource. Treated as a residual of commercial forest value, it is likely that initial estimates of such alternative use values will initially lower the aggregate estimated value because of the lack of comparable activity.
- A comprehensive land use plan that specifies areas for forest industry use and areas for alternative uses is essential to determining the total value of the Province's forests. Delineation of alternative use areas will limit the resources available to industry, thereby producing more rational pricing and encouraging higher value-added uses. It will also allow for comparable valuation of nonindustry uses.
- The comprehensive land use plan should be premised on the finiteness of forest resources and a stronger commitment to silviculture, whose cost should be incorporated in valuing the forest.

Recommendations

- Open, competitive bidding among industrial users should increase.
- Detailed estimates of the true value of the forest for specific uses – commercial and noncommercial – and the true costs of maintaining and enhancing such uses should be consensually developed and made subject to public review and critique as part of the land use planning process.
- In some cases, use of the forest resource as a free good should be phased out, and reasonable, but comprehensive user fees should be introduced in its stead.

CONCLUSIONS

Current stumpage does not reflect the market values that could be achieved by competitive open-bids. The competitive system will more accurately reflect the ability to pay, and, as a function of cost, drive use of the resource into higher value products.

The existing system is similar to that of a regulated utility, but, unlike utilities, industry has paid residual rents, or more recently target revenues, that are not influenced by market dynamics. Accordingly, systematic under- or over-payment resulting from a lack of market dynamics has resulted. Defenders of the residual system contend that it is based on appraisals of timber values, costs, and risk. However, appraisals themselves are estimates and only allow the Crown to receive adequate rent if they are accurate. Given the lack of a competitive marketplace and disagreements about the accuracy of resource inventory, that accuracy is questionable.

As a result, quantifying the extent to which industry has benefitted from low payments as a result of residual stumpage, or has suffered from an artificially high target set by an administrative process rather than open bidding is difficult. In fact, this state of affairs led to the Commission's recommendations for changes in the tenure system and for the elimination of administratively determined stumpage.

III AN HISTORICAL PERSPECTIVE ON STUMPAGE: A MIXTURE OF PRIVATE GAIN AND PUBLIC BENEFIT

A HISTORICAL OVERVIEW

Past, present, and future methods for charging timber companies rent for their use of the forest resource have led to institutional conflicts. Simultaneously managing a public resource for private profit, public benefit, and the use of future generations is difficult. Balanced achievement of these goals seems inherently in conflict. The Forest Act, Part 3, Section III (4), requires that the chief forester evaluate each application in terms of its potential for:

- Creating or maintaining employment opportunities and other social benefits in the Province
- Providing for the management and utilization of Crown timber
- Furthering the development objectives of the Crown
- Meeting the objectives of the Crown in respect of environmental quality and the management of water, fisheries, and wildlife resources
- Contributing to Crown revenues.

Each of objectives in an of itself is laudatory. The more difficult question is: can the government fulfill each objective without detriment to the others?

Our review of the tenure system in British Columbia since 1865 reveals changing and conflicting procedures used to maximize both private economic gain and public welfare. Beginning with the 1865 Land Ordinance as amended or augmented by supplemental legislation in 1884, 1888, and 1905 and the Timber Royalty Act of 1914, the focus was generally on the creation, retention, and promotion of the industry in the Province. Other factors influencing legislation included increasing demand for British Columbia timber as eastern U.S. softwood forests were depleted; construction of the Panama canal, which increased material movements between the East and West Coasts of North America; and related expansion of population and industrial activity in western Canada.

The licensing techniques that followed passage of the Timber Act of 1914 – primarily old temporary tenures (OTTs) and timber sales licences (introduced in 1912) – generated much needed revenues for the government. However, concerns about the long-term health of the resource, the use of public resources, adequate rent capture, and stumpage payments made the tenure system a continuous subject of public scrutiny.

Perceived problems with this early system included the long-term ineffectiveness of the upset prices as a platform for competitive bidding, the lack of competitive bidding, and the elimination of a comprehensive bidding system by removing substantial timber tracts from the competitive market to maintain guaranteed annual cuts of the most desirable timberlands for major processors.

In the mid-1940s, these efforts to rationalize the industry (i.e., to assure supply and good forest management) were instrumental in the promotion and implementation of the tree farm licence (TFL); TFLs secured stable raw material supplies for major processors, which in turn were to assume management responsibility commensurate with the length of the TFLs granted. However, even then, concerns were voiced about government's ability to implement sustained yield and achieve good management practices. Minimal competitive bidding was the industry norm.

A second tool, public sustained yield units (PSYUs), was created to increase bid opportunities for independent loggers, and/or sawmill operators that did not or could not submit proposals on TFLs. However, the publicly managed forests within the PSYU system were overcut. To maintain both competition and sustained yield, the Forest Service began to grant established operators guaranteed amounts of the allowable cut in a given PSYU unit. Such allocations eventually resulted in a "quota system," which has become an established part of current licensing procedures.

A third licensing technique, established in the late 1960s, was the timber sale harvesting licence (TSHL). TSHLs entailed a shift in Forest Service philosophy, where licensees were made partially responsible for management. TSHLs were typically granted for 10-year, annual cut licences and obligated the licensees to plant and reforest. TSHLs became the primary form of licensing in the PSYUs. Both PSYU and the TSHL were phased out in 1978. PSYUs became timber supply areas (TSAs) and TSHLs became forest licences (FLs).

These changes in licensing practices resulted in the diminution, if not the elimination, of competitive timber marketing practices. They also served to concentrate cutting licences with a smaller number of large companies.

THE STUMPAGE SYSTEM THROUGH SEPTEMBER 1987

Richard Schwindt in his study of the stumpage system indicates that the most accurate method of valuing standing timber is to "organize a competitive action and allow market forces to determine price" (p. 91). Obviously, long tradition and the numerous tenure contracts between industry and the Province made it difficult to employ such a simple solution.

For several decades a modified Rothery System was used to establish stumpage. Volume 3 of the Commission's *Background Papers* includes an examination of this system. Essentially, stumpage was viewed as the residual value after operating costs and allowance for risk and profit had been deducted from the selling price of the timber. This artificial system was based on the selling price of lumber and chips in the interior of the Province; another price was used for the coastal forests. The benchmark for the coastal forests was the price realized in the Vancouver log market; that market was considered an imperfect indicator, however, because of the small volume of logs sold there. The system for the interior was criticized for its use of a fixed chip price in combination with transaction prices for lumber; typically the "official chip price" was well below current value.

Operating costs were based on a formula predicated on the long-term, mythical "average efficient operator." This entity has generated substantial comment – both serious and humorous – over the years by members of the forest products industry.

THE STUMPAGE PRICING SYSTEM SINCE 1987

In October 1987, the residual value system was replaced by comparative value timber pricing. The impetus for change was the disagreement between Canada and the United States about alleged subsidization of Canadian softwood lumber resulting from underpricing Canadian stumpage. As a result of the disagreement, the government of British Columbia established initial target rates for the coast ($10.59/m^3) and for the interior ($8.59/m^3). Those target rates were set in consideration of several objectives; the most notable was the government's desire to eliminate the federal tax on softwood lumber exported to the United States. In other words, the initial target rates were set to raise stumpage revenues sufficiently to eliminate the tax on Provincial exports of softwood lumber to the United States – not on the basis of residual value pricing. A second factor driving the new system was, of course, the Province's estimated general revenue requirements.

The average target rates are adjusted to account for the different values of manufactured products that can be generated and for the costs of producing them in the Province's various timber cutting regions. They are then further adjusted, using Provincial softwood lumber index numbers for the coast and the interior as appropriate, to be responsive to fluctuations in lumber prices.

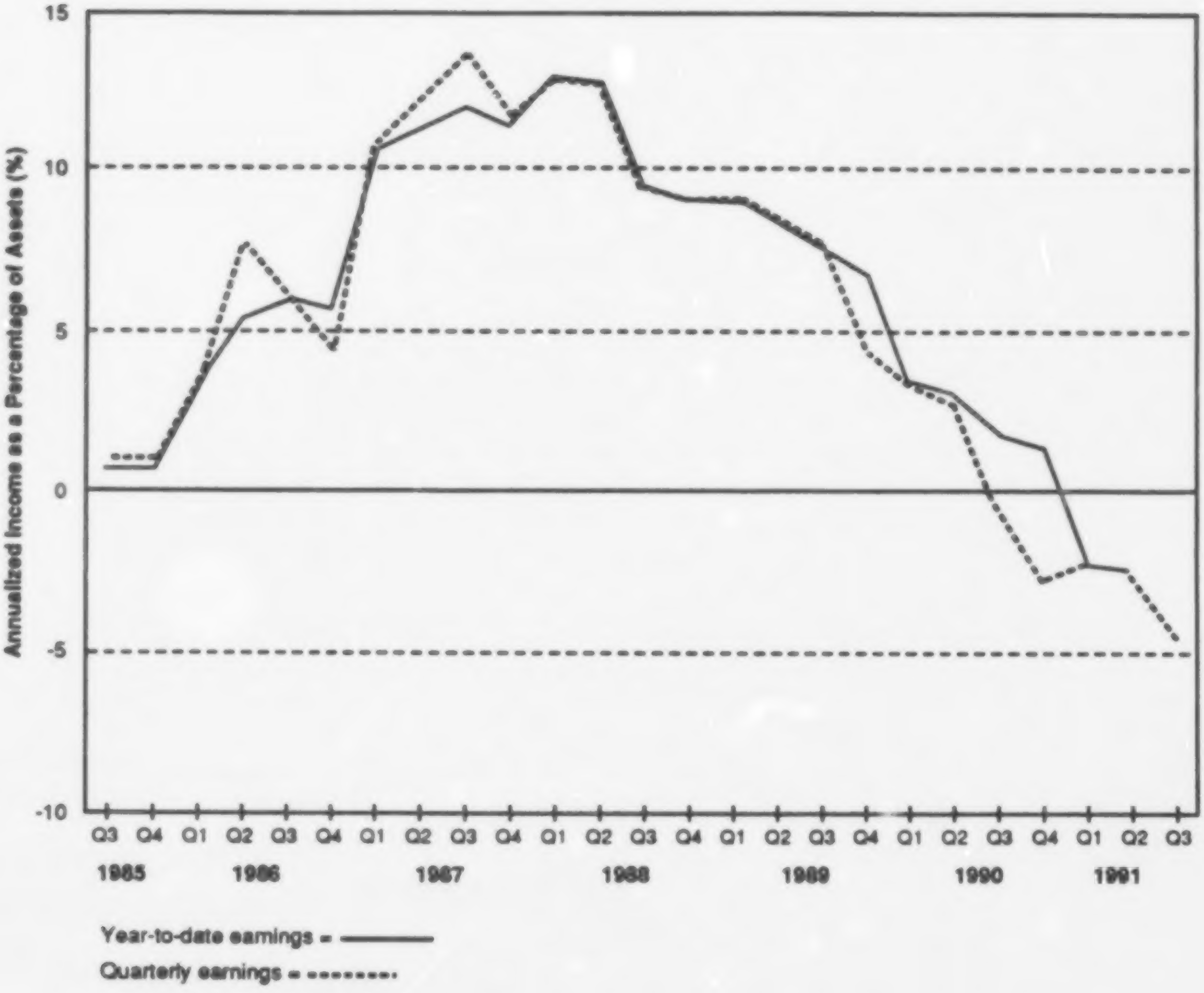
At present, 10 companies control more than one-half of the annual allowable cut on publicly held lands where FLs allow cutting in TSAs, and approximately 33 TFLs account for 22% of the annual harvest in the Province. Over time, this system has made about 85% of the allowable annual cut available for industrial use subject to stumpage contracts. These lands generate 68% of the yearly stumpage and royalty revenues.

Market forces worldwide substantially affect the annual harvest, as indicated in the volume cut on Crown forest lands over the past 6 years (see Table 3). Industry return on assets is also volatile (see Figure 3).

Table 3
HARVEST ON CROWN PROVINCIAL FOREST LAND, 1985-1991

	Hectares	Volume/Mm^3
1985-1986	210,397	72,345
1986-1987	226,464	73,036
1987-1988	238,969	80,008
1988-1989	237,456	75,621
1989-1990	194,134	77,654
1990-1991 (est.)	151,000	54,000

Source: Ministry of Forests, *Annual Report*



Source: Price Waterhouse, 1991

FIG. 3. INDUSTRY RETURN ON ASSETS, 1985-1991

IV SUGGESTED CHANGES IN THE TENURE SYSTEM

COMMISSION ASSUMPTIONS AND RECOMMENDATIONS

The Commission has concluded that timber tenure rights have become concentrated in the hands of major integrated companies that pay noncompetitive stumpage to the Crown. It has also concluded that the Crown would receive greater stumpage revenues over a long business cycle if efficient, Province-wide stumpage or log markets were established. The higher stumpage prices would (1) force the industry to shift emphasis from low-value commodity products to higher value products and specialties, and (2) provide additional funds for silviculture investments and enhanced stewardship for Crown forests.

The Commission has recommended a major change in the timber tenure system: providing secured tenure rights to no more than 50% of a company's present tenure rights and selling the other 50% of timber in the competitive market. This change is assumed to provide an effective way to obtain greater stumpage revenues over time by permitting market forces to operate, and to improve timber availability for medium and small companies. The increase in secure area-based tenure from 27% to 50% of AAC should encourage companies to practice intensive silviculture to enhance their AAC, particularly so if given the incentive of free stumpage on incremental volumes as the Commission has recommended.

ANALYSIS

The problems perceived and the solutions proposed appear reasonable in principle, but, given the unexpected consequences possible, great care is required in their implementation – especially so if revenue expectations are to be met. If the proposed changes reduce future investments, at least in the near term, the impact on jobs, stumpage, government revenues, and community stability may prove untenable. Possible economic adjustments should therefore be addressed and responsibility assumed for the long-term good.

If the Commission's recommendation for a significant alteration in timber tenure results in "truly competitive markets" for timber throughout most of the Province, many changes are likely. Two of the most important are:

- Some local mills could be outbid for logs – contrary to the Ministry of Forests' current charter to help assure community stability in selling timber—but only if substantially less efficient than competing mills.
- Uncertainty for tenure holders would increase and might adversely affect the competitive position of the industry and its ability to serve world forest products markets.

Nonetheless, the current tenure situation is so uncertain and insecure that no major private investments in intensive silviculture are being made and even needed plant modernizations are being delayed. A change in the tenure system could be seen as a clarification, leading to enhanced security if sufficient safeguards (i.e., remedies) could ensure government consistency.

Some analysts argue that constraints of an administered pricing system can't allow for rapid, accurate readjustment of stumpage prices to reflect the market. This argument has also been utilized in support of efforts to privatize public resources which are utilized in private production, i.e., timber. A recent, dramatic example where privatization has had significant impact upon the timber industry is New Zealand (see Chapter V). We believe that the New Zealand experience may have some applicability in British Columbia if public support for limited privatization can be achieved.

As noted previously, the industry is a major source of softwood lumber, softwood bleached kraft pulp, and newsprint for world markets, but it does not control those markets. Given the current depressed market for its principal products and the strength of the Canadian dollar, most major forest products companies are reporting severe losses; in fact, the bulk of down-time in North American newsprint and pulp is being taken by Canadian companies, particularly those in British Columbia. Given the weak market, sectors of the Provincial industry are opposed to changing tenure rights and moving to market stumpage prices in the immediate future. On the other hand, it would appear that today's poor market points to lower stumpage prices simply on the basis of reduced demand for logs.

Greater volatility in stumpage prices can be expected, given the typically large price fluctuations for softwood lumber, softwood bleached kraft pulp, and newsprint. As a result, the funds available for silviculture investments and enhanced stewardship will vary each year – a sharp departure from the current comparative value timber pricing system, which is revenue-driven. Target rates for stumpage were set in October 1987 "in consideration of a number of Provincial objectives, the most notable being the Government's desire to eliminate the federal tax on softwood lumber exported to the United States."*

Higher wood costs will exert pressure on the industry to process logs for their highest economic use by reducing their use for traditional commodity products. For example, when lumber prices are exceptionally strong and demand for pulpwood is weak, lumber producers use higher grades of pulp logs for lumber production. Conversely, when pulp prices are strong and lumber prices are depressed, lumber producers reduce their use of the lowest grade of sawlogs and divert them to pulp mills. Higher wood costs will also encourage the industry to invest in the production of value-added products.

FINDINGS AND RECOMMENDATIONS

SRI's findings and recommendations follow:

- The proposed tenure reallocation system – 50% of AAC allocated to companies with processing facilities and 50% retained by the Crown (to be reallocated) for a competitive bid matter for tenure holders without processing facilities provides stability, equity, and diversity of tenure.
- Open competitive bidding is a reasonable step toward capturing full value thereby assisting in the restructuring of the forest resource.

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*Stumpage Appraisal Information Paper No. 1, Comparative Value Timber Pricing, January 1, 1991, British Columbia Ministry of Forests, p. 2

- Significant economic readjustment will follow in the industry from these recommended changes.
- To avoid undue hardship, the new system should be introduced gradually to avoid reducing market-responsive productive capacity in the forest industry. The Provincial government should assist in minimizing economic impacts on rural communities.
- To offset the increased economic risk of modified tenure rights, limited privatization of timber supply areas that have minimal attraction for alternative use should be considered.
- Although it is easy to be critical of current patterns of tenure, future Resource Management Agreements should, to the extent possible, minimally disrupt efficient vertically integrated processing operations.

V COMPARATIVE PRICING STRUCTURES

The Crown's current and past strategies for selling standing timber have worked fairly well to attract investments for large mills that can make use of unexploited timber supplies. Investments have been made, employment has increased, and communities have stabilized. At the same time, however, historically low stumpage has been paid for captive wood, compared with that achievable through competitive bidding. This situation has probably contributed to the reluctance to expand into the production of higher value products and specialty lines.

FOUR PRICING ALTERNATIVES

United States – Competitive Model

An obvious example of a competitive bidding system is that of the U.S. Forest Service in the Pacific Northwest. Using prices paid by and the manufacturing costs for lumber, plywood, and chips for "an average efficient operator," the Forest Service appraises each sale to be offered in terms of species, quality composition, logging costs, and log hauling costs to a nearby mill. It then publishes, for review by all potential bidders, the minimum price acceptable. The timber can be sold through sealed bids or in an oral auction, with sale to the highest qualified bidder. Except for periods of deep recession in U.S. building materials markets, bidding has historically been spirited from the Willamette Valley north to the Canadian border. Except in isolated instances, timber is sold to the highest bidder without regard for mill location. This practice contrasts with the Provincial objective of seeking to sustain mill operations in small communities.

The Province's adoption of a bidding system similar to that of the U.S. Forest Service might eventually result in strong competitive markets throughout much of the Province. However, major differences between British Columbia and the Pacific Northwest could make it difficult to achieve some of the goals the Commission has proposed. For example, this model is not based on any explicit industry strategy for industry stability or the tacit encouragement of new business entry. In addition, the Ministry of Forests' goal of fostering small business operations, especially higher value activities, would be difficult to achieve under full adoption of the U.S. Forest Service model, which does not allow for concern for how many remanufacturing activities it fosters or does not foster.

New Zealand – Privatization Model

In 1986, the New Zealand government began privatizing government activities and property, including those of the New Zealand Forest Service which was the major owner of commercially useful timber. To determine a value for the timber assets of the new Forestry Corporation, the New Zealand Treasury studied the outlook for markets for the country's forest products, their price outlook as an indicator of the value of the resource, and appropriate rates of return on investment.

After lengthy consideration of the results of these studies, the Treasury and the Forestry Corporation decided to break the timber assets into "logical blocks" on the North Island and the

South Island and to offer them for sale to any bidder (with the right to refuse any offer). Most of the sales are reported to have been completed. However, no information is publicly available about the basis used for accepting or rejecting bids. Although attractive in its apparent simplicity, the New Zealand model has encountered some difficulties in transition.

Some similarities exist between New Zealand's economy and that of British Columbia – relatively few potential domestic bidders, a strong tradition of public ownership, a long tradition of providing wood for industry (important to both economies), and strong political concerns for the viability of outlying forest product mills. Assuming that the model will be successful over time, this method of selective disposition of public timber may have relevance for selected areas of the Province (i.e., certain segments of the interior).

Scandinavia – Private Cooperative Model

Sweden and Finland are heavily forested and have well-developed forest products industries. The timber ownership pattern in these two countries differs sharply from that in the Province. Most of these Scandinavian forests – two-thirds in Finland and one-half in Sweden – are owned by farmers and other small holders. The state owns only one-quarter of the forest in both Sweden and Finland. Industrial ownership is nominal in Finland and accounts for only 25% of the total in Sweden.

The methods of pricing timber are also different in Scandinavia. In general, prices for standing trees and for wood delivered to the roadside are negotiated annually (in advance of the next logging season) between industry groups and forest owners' associations for the principal species of sawlogs and pulpwood. The agreed-on prices reflect both the industries' willingness to pay for wood in view of recent experience and expected market conditions, and the small forest owners' willingness to cut their trees at those prices.

Timber taxation laws play a major role in the willingness of small private owners to sell their timber. In Sweden, small owners tend to regard their timber assets as bank accounts that will draw substantial interest (growth) if left uncut. Many of them prefer to let their forests grow until the time they need funds; they must pay a substantial tax on the value of their harvest.

The timber marketing methods and systems used in Sweden and Finland have limited applicability to British Columbia for several reasons:

- Forest ownership patterns are totally unlike those in the Province, where the Crown holds most of the timber.
- Governmental (and to a large degree, industrial) commitments to a strong social welfare system have long historical precedent in Scandinavia.
- Prices received for stumpage held by the predominantly small forest owners may not be the maximum that might be obtained through competitive bidding, but forest owners are relatively assured that reasonable prices will be paid when they wish to sell wood.
- Conflicts over the use of the forests are less common, given the comparatively slow rate of population growth and urban expansion.

The impacts of environmentalism on industrial timber harvesting operations in Sweden and Finland are minor in comparison to those in western North America. Most Swedes and Finns are well aware of the importance of timber and forest products to the well-being of their countries. Industrial timber owners and public agencies have a long tradition of accommodating fee-based public use of their timberlands for hunting, fishing, hiking, and the like.

Tasmania – Proposed Hybrid Model

Crown timber in Tasmania has been sold for many years to the forest products industry under a pricing and tenure system that grants exclusive long-term cutting rights to individual companies for close to 100% of their wood requirements. The system is based on an administered pricing system for sawlogs and pulpwood that is poorly related to market forces. In 1990, the Forests and Forest Industry Council of Tasmania examined the following four options for establishing a more efficient and market-based method for pricing Crown wood:

1. Market-based administered pricing – continued provision of 100% of tenure-holders' wood requirement and administered pricing for logs from Crown forests, but establishment and adjustment in royalties according to market conditions
2. Combined administered pricing and competitive bidding (different from Option 1 by reducing the annual timber supply assigned to holders of Crown allocations to 60% of their wood requirement) and sale of the remaining 40% in competitive bidding
3. Competitive bidding for standing timber (similar to the method used by the U.S. Forest Service in the Pacific Northwest)
4. Privatization of selected forest areas.

The Centre for International Economics, which conducted the study, recommended that Option 2 be chosen and implemented with a reasonable phase-in period determined by a negotiated process. This option would combine the administrated pricing of logs (set as a residual value for stumpage) with a significant component of competitive bidding for logs.

The Centre also pointed out that, from the standpoint of economic efficiency, Option 3 had many attractive features, but the Centre also noted the following disadvantages:

1. Some firms' apprehension about how they would perform in a highly competitive environment,
2. The lack of security of wood supplies for individual forest products companies
3. Concerns that a total auction system would be vulnerable to manipulation. This last factor played a major role in the Centre's preference for Option 2.

CONCLUSIONS

All of the alternative pricing structures offer valuable lessons that can be used in restructuring the government-industry compact in British Columbia. The U.S. "competitive" model provides a good example of a market mechanism that drives prices in rapid response to market conditions. The New Zealand privatization model may be applicable in selected areas of the Province, assuming the model is successful over time. The Scandinavian model points to the long-term success that may be achieved through government-private sector cooperation. From the perspective of institutional restructuring, the Tasmanian model may have the greatest applicability in terms of the joint effort needed to maintain industry stability and the competitive free-play required to respond to changes in market conditions.

VI FUTURE CHALLENGES: CREATION OF A DEFINITIVE LAND USE PLAN AND SILVICULTURE PRACTICE FOR ENHANCED STEWARDSHIP

Several factors suggest that any significant changes in the timber tenure system and annual allowable cut be delayed at least until the forest land use planning process is close to completion. Other important timber resource actions that must be undertaken in a timely manner include the development of an updated, comprehensive forest inventory, a fresh analysis of the future allowable annual cut, and a reassessment of the amount of restocking needed on lands reserved for industrial use. The land use plan should be completed in 2 years; inventory and assessment of restocking should be completed in 4 years.

A NEW LAND USE PLAN

The new land use plan should clearly delineate areas in which timber harvesting will be the predominant, if not exclusive, use and also specify how much timberland and wood is going to be shifted to nonindustrial and environmental uses. Following plan guidelines will be a complex undertaking. In some areas, it will be difficult to "achieve the full potential values" because some of the values will conflict with one another.

A major difficulty in developing a practical forest land use plan is that adamant positions may be taken by extremists on both sides of the issue of forest use. If the individuals and organizations selected to develop a new land use plan predominantly consist of those that hold extreme positions on the subject, little progress can be expected. Thus, a key ingredient for success in developing a reasonable land use plan will be the participation of professionals who understand the need for accommodating diverse uses of the Provincial forests. For example, those who favor more nonindustrial use of forests should also understand the importance of the forest products industry to the Province's economy. Those used to existing restrictions on their conduct of logging operations (e.g., in or near fishing streams and scenic areas) must recognize that more public access to those areas will increase restrictions and costs.

Put another way, successful development of a practical forest land use plan in British Columbia will require the participation of individuals who:

1. Understand and appreciate their opponents' point of view
2. Realize that compromises and trade-offs will be required among different forest uses
3. Are willing and able to persuade protagonists on either side of the wisdom of such compromises for the welfare of the public and the forest products industry.

UPDATED FOREST INVENTORY

An updated, comprehensive inventory of forest resources should be undertaken with full industry cooperation. In making the inventory, special attention should be given to delineating those areas most likely to be suitable for growing successive crops of trees for future harvests, as distinct from poor timber growing sites where – after the initial cut of merchantable timber has occurred – minimal silvicultural treatment will be justifiable because of the long period required for regrowth to maturity. The inventory should also include data on timber quality (i.e., the amounts of saw logs and pulp logs in different regions). This effort is crucial. Knowledgeable analysts project long-term increases in value for higher grade logs and a gradual but sustained decline in price for low-grade logs.*

FUTURE ALLOWABLE CUTS

After the timber inventory on lands remaining for industrial use is upgraded, a fresh analysis of the likely allowable annual cut in different Provincial regions should be made, including the likely quantities of sawlogs and pulp logs and how those quantities are likely to change over the long term. Once the inventory has been made, and realistic estimates of future log price trends for high-, medium-, and low-quality logs have been developed, a more meaningful estimate can be made of future stumpage revenues.

RESTOCKING AND TENDING NEEDS

Quantification of the reinvestment needed to assure sustained yield and enhanced multiple use of forests cannot be determined until the land use plan and the other tasks discussed above are complete. The amount of restocking needed should be then be reassessed. However, it should be noted that reforestation efforts have increased substantially in the past several years, in response to preliminary assessments of the forest lands that were not sufficiently restocked (see Figure 4).

The Commission's estimate (drawn from work by the Science Council of B.C. and Forestry Canada) that at least 3 times the recent silviculture expenditures will be needed for enhanced stewardship is likely to require additional growth and yield data to generate support for such an increase. SRI's discussions with industry and government indicated that a substantial (but as yet undetermined) portion of Crown timberlands may not deserve rehabilitation if silvicultural investments require rigorous economic justification.

For lands reserved for industrial use, criteria for intensive stand tending beyond the "free to grow" stage of basic silviculture must focus on the economics of growing wood in relatively short rotations. Priority should be given to lands with excellent timber (high site) growing capabilities or medium growth potential. At some stage in the examination of poorer sites, a point will be reached where it becomes uneconomic to make further investment in silviculture. (Other factors may influence decision-makers to proceed with investments on marginal timber-growing sites, but those making the decision should be aware of the negative economics.)

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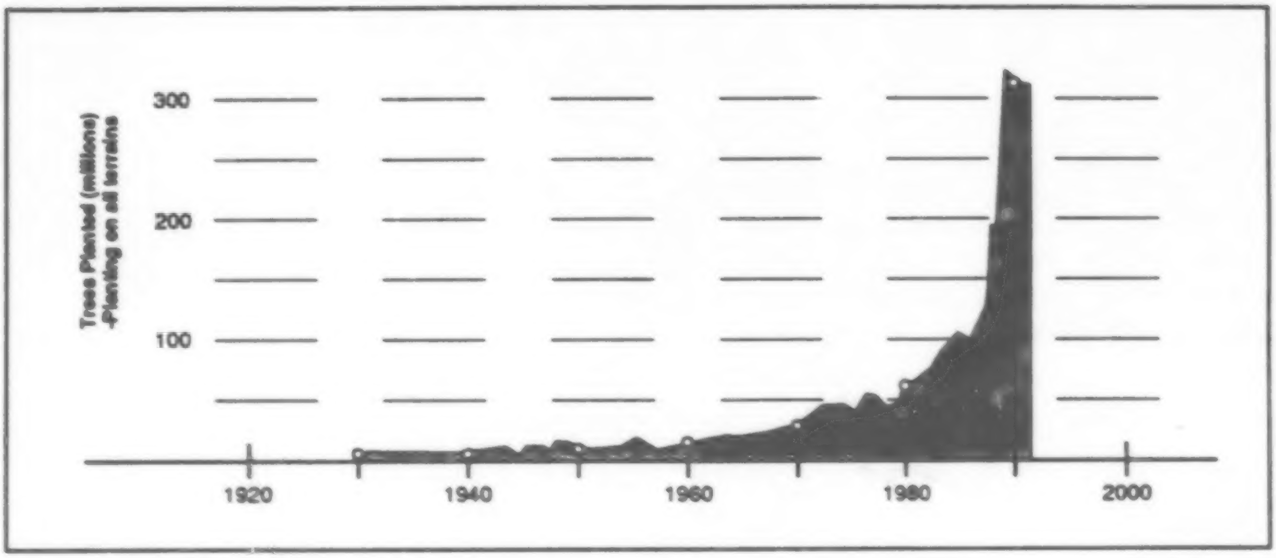
*Flora et al., 1991, "Future Pacific Rim Flows and Prices of Softwood Logs, Differentiated by Grade" (Washington, D.C.: U.S. Department of Agriculture: Forest Service).



Source: Ministry of Forests, 1991

FIG. 4. NUMBER OF TREES PLANTED IN BRITISH COLUMBIA

For the lands identified for nonindustrial uses, some portions may need to be restocked for aesthetic purposes. Decisions about the feasibility of restocking these lands will probably be based on different target rates for return on investment than those used for major investments on industrial holdings.

CONCLUSIONS

In October 1989, the Science Council of British Columbia published "*Forestry Research and Development in British Columbia, A Vision for the Future,*" which the Forest Planning Committee prepared. The Committee arrived at four investment options to consider in planning increased R&D for Provincial forestry. Of these, the Committee recommended the option for "increased investment on a reduced land base" as a reasonable vision for future planning. The principal assumptions informing this option are:

- A decline in the committed land base from 30 million hectares (ha) to 27 million ha by 2020
- More intensive forestry on good to medium sites
- An increase in the recent harvest of 80 million m^3/y to a potential yield of 120 million m^3/y at some point in the future
- Tripling of the annual R&D budget of $34 million to $100 million.

The Commission has suggested that expenditures for silviculture (recently estimated at about $350 million in public and private investment/year) be tripled to improve forest growth and yield in the Province. This appears to be in keeping with the Forest Planning Committee's recommendations for a tripling of the R&D budget. At this time, SRI concurs that the recommended increase should include funding for R&D efforts to sustain and increase yield on the retained land base, and to establish compatible alternative uses. It should be possible to conduct research in both these areas concurrently with development of the land use plan. All of these efforts should begin as soon as possible.

These recommendations should be regarded as reasonable estimates and objectives. As estimates, they will be subject to revision when the timber resource actions discussed above have been accomplished.

SRI recognizes, however, that these efforts will take time. SRI's review of the information provided, the past levels of silviculture and the stated goals and objectives of the Commission indicate that, at a minimum, a doubling of current investment levels is necessary before all the recommended resource actions are completed. On the other hand, the proposed tripling in silviculture investment to more than $1 billion per year seems realistic, given the long-term goals for the multiple uses envisioned for the Province's forests.

VII A FINAL PERSPECTIVE ON ENHANCED STEWARDSHIP AND THE COMPETITIVE ENVIRONMENT

OVERVIEW

SRI has met with numerous industry and government spokespersons who monitor the forest industry in British Columbia. They indicated that the industry functions in a difficult environment and that it is perceived as a "marginal producer" in the extremely competitive international marketplace. Industry representatives and the Ministry of Forests also noted that the industry is subject to numerous, conflicting political agendas and objectives.

The political arena, where so many decisions about the industry are made, is complex, in part for historical reasons. Stumpage has been historically low until recently as a result of the industry's evolution as a primary employer in the Province. In a compact with government and Provincial citizens, the industry has endeavored to maintain employment, provide comparatively high wages, and buttress economic stability in the numerous smaller towns that depend on utilization of the forest for their livelihoods.

On the other hand, rapid changes in the international marketplace, ongoing conflicts with the United States over benchmark pricing of the resource, and dramatic changes in Provincial political and environmental priorities point to the need for structural and contractual changes like those the Commission has recommended.

Other factors include the extent to which stumpage is a residual element of a system with substantial hidden costs for industry's social compact with politicians and workers, and the costly oversight and regulation system that the industry finances. Moreover, a substantial proportion of stumpage revenues is allocated to the general fund for general government services, as opposed to forest maintenance and improvement.

If the industry is to evolve into a cost-effective, efficient, and competitive international player, many of the economic disparities hidden in the structure of the pricing/revenue model should be modified. One example is the estimated regulatory cost for employee staffing, permit review, and processing, etc., which adds as much as $8/m^3 to the cost of timber harvesting. In addition, the Ministry of Forests contributed about $150 million to the Province's general fund in 1990. No one SRI interviewed in industry or government argues that social programs should be reduced or that the rationalization of industry should produce significant unemployment. The consensus, however, is that for the industry to be a more competitive player it must function unencumbered in the international forest products business – perhaps it must be encouraged to do so. Achieving that goal will require substantial investment in resource replenishment.

PROCEDURAL CHANGES

This report has discussed the advantages and disadvantages of the current tenure system and the Commission's proposals for introducing more competitiveness into the bidding for forest resources. SRI's perspective is that change in the tenure system structure is inevitable.

Accordingly, SRI reviewed alternative models that critics and supporters of the Commission's recommendations have proposed.

Industry concurs with the Commission that the "complete free market" model (i.e., predominantly open market competitive bid system for logs) is not politically or economically desirable. Although such systems (e.g., that for the U.S. Pacific Northwest) provide substantial benefits, the social structure that industry business practices have traditionally supported and the industry itself would most likely suffer severe economic dislocations if such a system were implemented. A "middle ground" system such as the one developed in Tasmania would allow for adequate market flexibility and competitive bidding, while at the same time minimizing the economic impacts associated with the severe market swings endemic to a completely unregulated market system.

The major advantage of the introduction of a modified market bid system would be the gradual elimination of the administered comparative value stumpage system that is perceived as unfair owing to previous residual systems that allowed various noncompetitive cost factors to persist. Those factors include concern for community stabilization, inefficient labor practices, focus on producing low-cost commodity products, and inadequate emphasis on new product development. With the introduction of a market bid system, raw material value will fluctuate as a result of competition to purchase raw materials. This primary cost factor will be instrumental in competing companies' ability to add to the production stream the incremental cost for labor, labor/overhead, equipment, distribution, marketing, and investment in new business strategies, technologies, and products. In this respect, a new process for the sale of public resources will be beneficial to Provincial taxpayers.

On the other hand, such market adjustments should take place over time. Consequently, the Commission's recommendations are well taken that:

- The system be introduced incrementally – concurrent with replacement of existing tenure contracts
- Specific land use plans be prepared for use of timber supply areas
- Government and industry work together to identify the higher value, quality goods needed to accommodate more demanding end-product manufacturers and consumers.

Ongoing focus on product innovation and the design and tooling of special products will be necessary to compete with international producers of semifinished to specialized high-value wood products.

Recent studies on how to ensure that the Province's forest industry is internationally competitive have stated that the following factors must be addressed in the transition period:

- Long-term nontariff trade barriers that impede ease of movement of timber, semifinished and finished wood products to the United States and other major markets
- The increasing proclivity of large or multinational corporations to locate primary processing operations in areas that have few environmental regulations, have lower labor costs, are near major markets, etc.

- The commitment to the established product mix, which does not account for the most efficient timber utilization or processing technology innovations
- A lag in the formation of large cooperative marketing and distribution networks like those Japanese and European manufacturers have established to penetrate U.S. and Asian markets.

OPERATIONAL CHANGES

Changing a tenure and stumpage system in evolution for 75 years will undoubtedly entail problems. Accordingly, the Commission and the Ministry of Forests should work closely with industry in developing market mechanisms that efficiently allocate harvesting rights.

It has been suggested that one method for estimating the validity of the bidding process would be the extent to which it is based on the export of a representative sample of raw logs to the United States or overseas to establish benchmark and upset pricing of the domestic supply and international market demand.

LAND USE AND ENHANCED STEWARDSHIP

Many Commission recommendations for a new tenure system, efficient resource development, and marketplace efficiency will be achieved more readily if a land use plan is developed that clearly delineates areas for harvesting and cultivation. Such delineation is in keeping with industry's intent to be a permanent committed investor in forest resources.

Industry commitment to enhanced stewardship will be directly commensurate with the extent that a new bid system evolves concurrently with a tenure system that provides for guaranteed long-term supply and harvest. The system must also allow for competitively responsive reforestation and sustained yield utilization of the areas designated for commercial forest use.

COSTS ASSOCIATED WITH ENHANCED STEWARDSHIP

SRI has examined estimates of silviculture investment needed in the Province. Many nonindustry observers believe that companies holding forest or tree farm licences have made only minimal investments in silviculture. Some of this perception is attributable to philosophic differences about public access, multiple uses of second- and third-growth forest lands, and the extent to which management values other than reforestation for commercial harvesting will receive adequate accommodation by the industry. But the greater impediment to industrial silviculture (beyond the basic forestry stage) is the uncertainty of tenure, which discourages the long-term investments required. The Commission has attempted to correct this by recommending an increase in area-base tenure, and more secure contracts through specific RMAs.

Silviculture requirements for enhanced stewardship will impose a substantially greater burden in the future. Currently the weighted average private investment in silviculture is approximately \$2.60/m^3 of annual timber harvested; in addition, provincial and Federal expenditures are approximately \$2.24/m^3*. Estimates for the intense silviculture required by enhanced stewardship for commercial forest cultivation and increased public utilization range between \$10 and \$15/m^3. This added investment will make substantial additional revenue demands on industry, especially if large portions of high-quality old-growth forest are removed from commercial forestry uses.

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*Based upon information compiled from the Ministry of Forests and Forest Industry Association

Estimates of 2 to 3 times current silviculture investment appear to be realistic. However, SRI is unable to provide a firm estimate of cost without an updated land use plan that provides clear guidelines about which Crown lands will be available under new Resource Management Agreements for long-term use and reuse.

GOVERNMENT'S ROLE

The fundamental changes proposed in the Commission's study highlight the role of government as a protector of resources for generations unborn. The government must also sustain the economic vitality of the Province. This dual social mission requires that the relationship between the Provincial government and the Province's major timber industries be maintained and enhanced. Consequently, in the near term the Ministry of Forests and the government need to provide:

- Clear guidelines to industry about the timeframe in which the recommended changes in tenure and/or stumpage will take place
- A commitment to help industry upgrade and diversify the product mix needed for major, proactive participation in the international marketplace
- Development of policies that stimulate industry investment in national and international marketing, product development, and distribution techniques that allow for greater production of higher value and value-added products
- Commitment to working closely with industry as it adjusts to the new system of tenure and market-based pricing of the resource, and begins to offer more market-responsive products that take advantage of the quality of the raw materials available in the Province, its proximity to the United States (the world's largest user of semifinished and component wood products), and its expanding position in the Asia-Pacific market.

The objectives of the proposed public actions – changes in the tenure system, a use-prioritized land use plan, increased silviculture, and support of identifying, developing, and selling higher value end-use wood products – are all geared to improving the long-term value of the forest and extracting more financial and nonfinancial value for the stakeholders. We believe that specific incentives can help advance this goal. Such incentives could include:

- Creation of a market-based pricing system (i.e., competitive bidding on a substantial portion of the annual commercial forest harvest)
- Utilization of tax incentives and public funds to help develop and promote the higher value sector of the forest products industry
- Tax abatement, stumpage-free timber and other performance-based incentives, i.e., increased AAC, for industry members that identify and penetrate higher value markets

- Cooperative efforts by industry and the Province to promote and expand exports of high value-added products to offshore markets
- Increased use of industry cooperatives focused on well planned export campaigns for targeted products and markets
- Creation of an administrative structure to promote and maintain stability in the industry with appropriate control over annual harvest, the log market, disbursal of public funds for silviculture, and related resource improvements.

VIII BIBLIOGRAPHY

Anderson, Michael H. and Jeffrey, T. Olson (1991). Federal Forests and the Economic Base of the Pacific Northwest: A Study of Regional Transitions (Washington: Wilderness Society).

Australian Bureau of Agriculture and Resource Economics (1990). Fiscal Approaches of State Forest Management Agencies (Canberra: Australian Bureau of Agriculture and Resource Economics).

COFI (1989). The Vancouver Log Market: Report to the Select Standing Committee on Forests and Lands (Vancouver: COFI).

COFI (1990). Response to the Standing Committee on Forests and Lands (Vancouver: COFI).

COFI (1991). An Assessment of the B.C. Forest Resources Commission Report: "The Future of Our Forests" (Vancouver, B.C.: COFI).

Drushka, Ken (1985). Stumped: The Forest Industry in Transition (Vancouver: Douglas and McIntyre).

Flora, Donald, Andrea Anderson and Wendy McGinnis (1991). Future Pacific Rim Flows and Prices of Softwood Logs, Differentiated by Grade (Washington: Department of Agriculture, Forest Service).

Forestry Canada (1990). *Selected Statistics Canada 1990 Information Report*, E-X-44, Economic and Statistic Directorate (Ottawa: Forestry Canada).

Forestry Planning Committee, The Science Council of B.C. (1989). Forestry Research and Development in British Columbia: A Vision for the Future (Vancouver: Science Council/B.C.).

Gunton, Thomas and John Richards (eds) (1987). Resource Rents and Public Policy in Western Canada (Halifax: Institute for Research on Public Policy).

Interior Lumber Manufacturer's Assoc. Interim Response to "The Future of Our Forests": BC Forest Resources Commission (Kelowna: Interior Lumber Manufacturer's Association).

MacMillan Bloedel Ltd. (1991). Some Comments on the Forest Resources Commission Report: "The Future of Our Forests" (Vancouver: MacMillan Bloedel, Ltd.).

Ministry of Forests (1991). Stumpage Appraisal Information (Paper 1): Comparative Value Timber Pricing (Victoria: Ministry of Forests).

Ministry of Forests (1991). Review of the Timber Supply Analysis Process for British Columbia Timber Supply Areas: Final Report (Victoria: Ministry of Forests).

Percy, Michael (1991). A Review of "Managing British Columbia's Forest Resources: Structural Alternatives, Financial Considerations and Valuation Estimates," (Edmonton: University of Alberta).

Price Waterhouse (1990). The Forest Industry in British Columbia (1989).

Price Waterhouse (1991). The Forest Industry in British Columbia (1990).

Rinehart, James A. and Paul S. Saint-Pierre (1991). "Timberland: An Industry, Investment, and Business Overview." (San Francisco: Pension Realty Advisors; a report for The Hancock Timber Resource Group).

Runyon, K.L. (1991). Canada's Timber Supply: Current Status and Outlook: Information Report E-X-45 (Ottawa: Forestry Canada).

Schwindt, Richard (1985). "The British Columbia Forest Sector: Pros and Cons of the Stumpage System," Resource Rents and Public Policy in Western Canada (Gunton and Richards, eds) (Halifax: Institute for Research and Public Policy).

Stanbury, W.T. (1991). The Future of Our Forests: A Curate's Egg (Vancouver: UBC).

Timwood Consulting Group (1991). Synopsis: The Strategic Assessment Study of the B.C. Solid Wood Industry (Stockholm: Timwood).

APPENDICES

APPENDIX A

THE COMPETITIVE MARKETPLACE: AN OVERVIEW

THE PRIMARY ISSUE—HIGHER VALUE

During the course of our work we have had the opportunity to discuss with numerous people possible future scenarios for the forest products industry of British Columbia. Ultimately the overriding issue can be presented as a simple hypothetical—can and should the industry primarily remain a volume driven, "marginal producer" responsive to the supply demands of large industrial economies or can and should the industry gradually and selectively convert part of its productive capability into cost driven, higher value products responsive to new, unique niche markets?

This issue is one which has generated tremendous interest and controversy in the Province over the past several years. It is not a pure business issue. The Provincial government sees the necessity of investing more and more money in the forest to maintain the sustained yield of a high quality competitive commodity; on the other hand it is the forest and the forest products industry which must generate the needed public revenue to sustain the quantity and quality of the harvested forests as well as those portions of the forest which will be preserved and utilized for nonindustrial uses.

It is the recognition of these dual responsibilities which has generated increased attention to the feasibility of identifying, developing and marketing higher value wood products for both domestic and export markets. We have discussed these issues throughout the course of our work with numerous, informed individuals. Given the current status of the industry it is not surprising that there is a common perception that any proactive marketing or investment steps at this time are laden with risk.

On the other hand we have not been retained to undertake a detailed, in-depth marketing assessment of this issue. Work is being undertaken on this matter by marketing and product specialists at the present time. A great deal more work will be undertaken in the future. Nonetheless we have developed a series of first impressions for the general readership concerning some of the possibilities in terms of new markets and new products.

One cautionary note must be made. It becomes increasingly apparent that entry into the higher value, niche markets will, most likely, involve new, smaller remanufacturers who can function in smaller markets with relatively short product life cycles. New employment opportunities will be generated but they will not be guaranteed over the long run. Today's successful niche market product will be challenged by new competitors who can duplicate the product, identify new areas of cost savings, and enter established markets. Arguably, the new employment opportunities may be volatile, vulnerable to rapidly changing product mix and dimension requirements, market instability and new competitors.

An area of challenge and opportunity may well be how to accommodate and encourage remanufacturers of higher value products, allowing them to build upon the established supply, distribution, and marketing networks which the large forest industry companies have in place, domestically and internationally.

We believe such efforts must receive public support, allowing the industry to enter these new markets incrementally and in tandem with proposed changes in the tenure system. Also, realistic incentives must be identified and used to encourage higher value efforts.

Given the long-term dominance of large vertically integrated companies, the relatively small domestic market, and intense competition, success in this market will require focused market analyses and product identification, and sustained capital investment. If the higher value approach proves successful, return on investment may still be slow to come. Moreover, the direct or indirect participation of established companies with adequate resources is likely to be required. Imaginative niche producers and, possibly, foreign partners willing to invest in this market sector with local producers may well be required in cooperative association with established volume producers.

In summation no one assumes that higher value forest products will be an easy market to enter and compete in successfully. On the other hand, few observers will assert that the industry can continue to function only in the traditional mode.

PRIMARY PRODUCTS

This overview addresses:

- The traditional industry commodity focus on softwood lumber, market pulp, and newsprint
- Requirements of the primary markets – the United States, Europe, and Asia
- Prospects for major commodities and the effects of environmental regulations on future supplies from the competing western United States
- Challenges to the Province's competitiveness in major markets to address in making policy changes
- A review of factors and issues to resolve before pursuing higher value product markets.

The demand for softwood lumber will remain strong, especially in the United States. Overall demand for newsprint will be stable. Increases in demand for pulp in the Pacific Rim will be offset by a likely decline in U.S. demand caused by the increasing use of recycled pulp and chlorine-free bleached pulp mandated by U.S. environmental pressures and regulations. Care should thus be taken in making major capital investments to increase plant capacity because other important markets may eventually adopt many U.S. regulations.

Several challenges are entailed in maintaining growth in commodity product sales, as well as in successfully pursuing noncommodity product markets, and those challenges should be considered in making policy changes. At the same time, the chance for success, the rewards, the risks, and the "costs" of these changes need to be defined and made known to all interested parties before changes are made.

The remainder of this appendix discusses the factors behind the probability of success for the following market sectors:

- Commodity products
    - Softwood lumber
    - Newsprint
    - Market pulp
- Value-added products
    - Millwork and moulding
    - Wood kitchen cabinets
    - Furniture components
    - Structural wood members
    - Reconstituted wood products (structural applications)
- Higher value products
    - Treated wood
    - Panelling
    - Industrial blanks
    - White papers.

To continue as a major contributor to the Province's well-being, the forest products industry must be economically viable and competitive in world markets. Thus the marketing environment and the effect of changes in timber policy on industry's ability to sell its products need to be considered in evaluating the Commission's recommendations.

This section briefly examines the outlook for major forest products markets and indicates challenges to the Province's future competitiveness in those markets. The section also reviews factors and issues that need to be resolved before the Commission can conclude whether the industry can successfully pursue higher value product markets. These comments are not intended to substitute for ongoing and rigorous analyses of the Province's competitiveness that we recommend.

Commodity Products

The Province's forest products sales are concentrated in softwood lumber, market pulp, and newsprint (see Table A-1), which collectively constitute nearly 70% of forest product revenues. These products are important for several reasons.

- The Province's relatively low hydroelectric costs have allowed it to compete in manufacturing market pulp and newsprint.
- The Province has had an ample supply of quality softwood fiber.
- Provincial wood costs have been equal to or lower than those of its major competitors.

At the same time, the industry's production capacity far exceeds domestic demand, and the industry is thus dependent on foreign markets. The United States, with its large, recurring shortfall in domestic supply of one or more of the three products, has traditionally been the largest market for the Province's products. In 1990, for example, the United States purchased the following portions of Provincial production:

- 54% of its lumber
- 76% of its newsprint
- 28% of its market pulp.

The residual exports are shipped to Europe and, increasingly, to the Pacific Rim. For example, shipments of lumber (by value) in 1990 were 25% to Japan and 18% to other Pacific Rim and European nations; 16% of newsprint (by value) was shipped to the Pacific Rim and 5% to European nations; 36% of market pulp (by value) was sent to Europe and 31% to Pacific Rim nations.

Table A-1
BRITISH COLUMBIA FOREST PRODUCTS
SALES BY CATEGORY, 1989-1990

	Millions of Dollars (1989)	Percent (1989)	Millions of Dollars (1990)	Percent (1990)
Lumber	4,648	34	4,284	36
Market pulp	3,597	26	2,681	23
Newsprint	1,242	9	1,195	10
Chips and other by-products	913	7	810	7
Plywood and veneer	637	5	507	4
Log exports	275	2	172	2
All other	2,259	17	2,196	18
Total	13,571	100	11,845	100

Source: "The Forest Industry in British Columbia, 1989-90," Price Waterhouse, Vancouver, British Columbia

In recent years, however, major changes have jeopardized the Province's competitive position in its traditional markets. These changes and challenges for each commodity product market are discussed below.

Softwood Lumber

Approximately half of provincial softwood lumber is shipped to the United States. Japan is an increasingly important market purchasing approximately 25% of annual production at the present time. Demand in other Pacific Rim nations is growing steadily from a small historic base.

New residential construction in the United States, the largest single end use for British Columbia softwood lumber, declined from 1.8 million private housing starts per year in the 1970s (excluding mobile homes) to an average annual rate of 1.2 million units (excluding mobile homes) in the 1989-91 period. SRI analyses indicate that average annual demand for new U.S. housing units in the 1990s will be no more than 1.4 million units exclusive of mobile homes.

Mobile home production will generate an additional 200,000 units per year. Slower growth in population, maturation of the "Baby Boom" generation, diminished ability to buy housing, and land use constraints are the primary factors behind this outlook for residential construction.

Despite the outlook for fewer U.S. housing starts, prospects for continued growth in U.S. demand for the Province's lumber are relatively positive. Most new housing units are likely to be single-family homes, which use considerably more softwood lumber than do either multifamily units or mobile homes. Furthermore, despite some substitution by competing materials, the traditional preference for wood and the extensive infrastructure of small builders accustomed to employing wood are likely to sustain the use of lumber and wood-based materials in home construction.

The U.S. West and Midwest will continue to be the Province's primary markets for softwood lumber. Projected growth in residential construction in the U.S. West is likely to exceed that of the rest of the United States.

The Province's prospects for lumber sales are also brightened by constraints on the U.S. West's indigenous supply of timber. Environmental pressures have reduced allowable cut for lumber producers in Washington, Oregon, and California. The U.S. western market is thus likely to draw more heavily on supplies from Canada and elsewhere than in the past. The extent to which this occurs and the timing over the next 5-10 years are important in the context of long-term investments in the Provincial lumber industry.

Strong growth in the home repair, remodeling, and renovation markets for lumber has compensated for less new construction. The aging of U.S. housing, improved products, and economic incentives to renovate rather than "build new" have been the primary drivers behind the growth in lumber consumption. These trends are expected to continue and will help assure continued increases in U.S. demand for softwood lumber.

The possibility of rapid expansion of softwood lumber exports to the Pacific Rim or Europe is nominal at the present time. Indicators to monitor include future housing starts for the regions (especially Japan where wood is used extensively), the likelihood of these countries' lowering trade barriers, and whether competition from other wood-producing areas such as Chile, New Zealand, and perhaps the Soviet Union will intensify.

SRI's review of trends in the Canadian and U.S. export of softwood lumber indicate that, although large market potential exists, significant competition, high trade barriers, and preferences for non-North American sizes of dimension lumber and different wood species all point to relatively slow growth in the offshore market for North American lumber. Two of these factors, trade barriers and dimension requirements, are obviously factors which knowledgeable, informed producers can seek to modify or change in response to end user preference. In the near term, however, the United States and Japan will continue to be the primary markets for British Columbia softwood.

Newsprint

Nearly 90% of British Columbia's newsprint production is exported – 76% (by value) in 1990 to the United States, with approximately 95% of that to the U.S. West. The residual newsprint exported is spread between Pacific Rim and European importers. Future prospects in the U.S. market are clearly important to the Province.

U.S. demand for newsprint has been growing slowly. As a result of fluctuations in advertising caused by economic cycles, U.S. newsprint demand increased only 1.7% annually between 1980 and 1990, and SRI forecasts 1-2% annual growth in U.S. newsprint consumption during the 1990s (about 200,000 metric tons per year, or roughly the equivalent of one new world class machine's capacity annually).

The slow growth in demand results from:

1. A gradual decline in newspapers' share of advertising expenditures as advertisers shift to direct promotion, packaging, in-store merchandising, and other media.
2. Little or no increase in newspaper circulation because of slow growth in the adult population, declining readership, demise of some large metropolitan newspapers, and the growth of electronic communication media.

On the other hand, successful efforts to make newspapers more "user friendly" and consolidations among publishers have stabilized the newspaper industry's market position for the present.

The key uncertainty concerning long-term demand for newsprint is the long-term potential that electronic home communication systems present for eroding newspapers' share of advertising and readership. Will these systems expand sufficiently to attract advertisers away from other media, including newspapers?

U.S. newsprint production – mostly in the southern United States – rose 3.5%/y in the last decade. U.S. producers accounted for 46% of domestic consumption in 1990, an increase from 39% in 1980. Growth in ownership of newsprint mills by newspaper publishers and increased production in the U.S. South and West have eroded Canada's position as a market supplier. Continuation of these trends or the emergence of new ones are important issues for the Province's competitive position in newsprint.

Newspaper publishers' purchase of newsprint with a specified recycled fiber content will also help determine the Province's share of the U.S. market. For example, as a result of legislative requirements, California publishers anticipate that 30% of the newsprint they purchase in 1994 will need to contain 40% recycled fiber. capacity in North America to provide this fiber is likely to continue to expand significantly (e.g., deinking capacity expansions have recently been announced in California). Provincial producers' ability to economically collect or purchase postconsumer fiber, produce deinked pulp, and use that pulp in manufacturing will be major elements in determining whether the Province remains competitive in newsprint.

Prospects for newsprint exports to non-U.S. markets are mixed. The share of Canadian newsprint production exported to other countries has essentially remained unchanged over the past 10 years. Newsprint capacity in Japan and Western Europe (which are both large export markets) has increased faster than those regions' domestic consumption, suggesting that imports are unlikely to increase significantly.

The prospects for exporting to former Eastern Bloc and Soviet countries will require careful ongoing analysis to determine a realistic market share there for the Province. In the short run, these markets will be volatile and entail high risk; capturing a stable and substantial share over the long term will require both commitment and patience.

Market Pulp

Market pulp (primarily northern bleached softwood kraft), the Province's second most important forest product, is used in making paper and paperboard. But because those products respond quickly to economic shifts, market pulp prices can fluctuate widely from year to year. Market volatility is accentuated by the actions of integrated pulp and paper mills. For example, when the demand for paper or paperboard manufactured at "pulp-long" mills increases, those mills generally use more of their own pulp to make paper product(s), thus reducing the pulp sold just when the market needs more pulp because of increased paper/paperboard sales. Conversely, when demand for paper/paperboard declines, the same mills need less pulp for internal production and sell the excess pulp, thereby increasing pulp supply at a time of declining demand and further depressing prices.

Depending on current prices, market pulp – unlike many other forest products – can be competitively shipped to many parts of the world. As the area most deficient in fiber, Western Europe has historically been the largest net purchaser of market pulp. Consequently, international pulp prices depend in large part on market conditions there. Producers from Canada, Scandinavia, the United States, Chile, and Brazil are major competitors in trading this product. Shifts in their exchange rates and those of other countries add to the volatility of this business. Moreover, because pulp mills are capital-intensive, periods of minimal expansion in pulp capacity have occurred.

Growth in paper/paperboard sales and limited expansion in pulp capacity made 1985-1989 a period of strong demand, high prices, and profits for market pulp. British Columbia shared in this prosperity. Average delivered pulp prices to the United States nearly doubled, and in 1989 market pulp accounted for 26% of the Province's forest products sales. A decline of more than 30% from the 1989 sales levels has since occurred, however, and is a major cause of the poor financial performance of the industry during 1990-91. Nonetheless, sales in 1990 indicated the balanced market for British Columbia pulp products. Exports (by value) were 36% to Europe, 31% to the Pacific Rim (including Japan) and 28% to the United States.

The 1990-91 reverse in the market is indicative of the industry's vulnerability. The major uncertainties surrounding prospects are growth in demand by type of pulp and the competitiveness of major pulp producing regions. Environmental pressures (mostly the need to reduce landfill) are creating unprecedented demand for modern deinking capacity to produce recycled pulp – a trend that lowers demand for virgin pulp. Ongoing monitoring of the rate of increase in demand and practical limits to the use of recycled pulp will thus be important in evaluating the outlook for virgin pulp. Changing needs worldwide for softwood versus hardwood pulp constitute another unknown that will have to be continuously analyzed; however, hardwood's share has been growing.

Environmental pressures have also increased the rate of substitution of chlorine-bleached pulp by pulps bleached with little or no chlorine. External markets are exerting strong pressures to reduce chlorine content even further, if not eliminate it completely. This trend's effects on the Provincial market pulp outlook thus deserves close monitoring.

Prospects for the Province's pulp industry will be primarily dictated by the need for virgin softwood kraft in the Pacific Rim and the United States. U.S. imports of kraft pulp are unlikely to increase significantly, and a long-term decline in U.S. imports of kraft pulp is likely, given the mandate for recycled pulp. Pulp demand in the Pacific Rim, on the other hand, may be promising. A major uncertainty, however, is the possibility of the Soviet Union becoming a more aggressive exporter of wood fiber to that region. In addition, stronger competition in European pulp markets from the low-cost wood producing regions of Latin America is probable.

Value-Added Products

British Columbia prospects in value-added forest products vary considerably by product. For some products, the market is large and moderately fast growing, but characterized by intense competition. For other products, substantial investments of time and capital will be required to be competitive in the future. From the conventional perspective the lack of proximity to final destination markets, i.e. major population centers in Canada and the U.S., has been and will continue to be the major impediment which must be circumvented.

On the other hand, given the high quality of the raw materials in British Columbia, the industry must continue to pursue appropriate targets of opportunity in this sector. The effort should focus on both higher value and value-added products because the softwood lumber and pulp markets will continue to be volatile.

Considering the diversity of opportunity for the Province in the value-added market, manufacturers will need to continuously identify product lines in which they can compete effectively and to evaluate growth prospects for uniform value-added products in specific markets. Unique "niche" products will, initially, have a captive market. Over time, however, competition locally and internationally will duplicate successful product lines. At that point, comparative labor, manufacturing, and transportation costs will increasingly impact market share.

Overviews of five major value-added product categories are presented below. Existing major markets are examined. Other potential markets, particularly in Europe and Japan, are identified. Market intelligence on each of these categories is in a state of flux and requires constant updating and review.

Millwork and Moulding

Millwork and moulding is one of the largest and fastest growing of the Provincial product categories discussed here. Prospects are favorable for remodeling and renovation, a large end-use market for millwork. Within this broad category, wood window units accounts for approximately 25% production, doors 17%, and moulding 12%. The balance consisted of such wood products as stairs, window sashes, and door/window frames.

Reduced U.S. supplies of hardwood and quality softwood fiber for mouldings has increased the production of finger-jointed products. Although these grades are quite suitable for painted applications, the Province's high-quality softwoods may find a receptive market for unpainted moulding and millwork applications. Provincial exports to Europe, particularly Germany, have been increasing, specifically "clear" hemlock blanks and components used in door/window framing.

As noted previously, the U.S. West is an intensive user of wood products in construction and is therefore likely to be among the most promising U.S. regional markets for millwork and moulding. However, given that region's own large wood resources, its millwork and moulding capacity is already substantial. Converting operations in California, Oregon, and Washington collectively account for nearly 25% of total annual U.S. millwork shipments.

Delivered costs for Provincial millwork and the threat of competition from imported millwork products should be considered when evaluating the feasibility of value-added opportunities in millwork and moulding. Potential competition from nonwood products in moulding and millwork will increase in the future.

Wood Kitchen Cabinets

Wood cabinets have not been a major export item in years past. The proximate U.S. market is, however, the target of opportunity given the huge demand in the states for this product.

The value of U.S. shipments of wood kitchen cabinets and cabinetwork was $4.4 billion in 1987.* Between 1981 and 1987, the constant dollar value of these products rose 8%/y. This value-added category is less diversified than millwork. Stockline built-in cabinets accounted for 40% of shipments; custom-made kitchen cabinets for 26%; and vanities for 11%.

Conventional competition in both cabinets and millwork is characterized by a large number of small, often undercapitalized producers that serve local markets. Achieving low transportation costs for these bulky products and providing service to this semicustom business are important ingredients for success. Determining prospective changes in the use of softwoods in cabinetry (hardwoods now predominate) is also important.

British Columbia's greatest opportunity in this industry might be supplying standard millwork sizes and components to final assemblers close to large end-use markets. It may also be advisable to form strategic alliances or provide capital to these assemblers to ensure long-term viability in this market. The bulk of the product would be shipped to the most proximate markets, the urban metropolitan areas of western Canada and the western United States.

Furniture Components

Historically, higher quality wood furniture sold in Canada and the U.S. has been made from hardwood. For example, on the basis of value, 80% of the wood furniture produced in the United States is made from hardwoods, not the softwoods found in the Province. Well over 50% of furniture sold in Canada is hardwood frequently assembled and shipped from the United States. Nevertheless, change is occurring. For example, U.S. furniture manufacturers consumed $200 million worth of softwood lumber in 1987. There is informal opinion that since 1987 manufacturers are using more softwood with high quality veneer for sale in Canada and the U.S.

Softwood-based furniture is reported to be more widely used in other countries. Markets for kits or packages of softwood based furniture assembled by end users are among the value-added product opportunities the Province is considering. The feasibility of producing and selling blanks of softwood lumber (with the size specified by the customer) for export to European makers of unassembled furniture is also being investigated. Joining forces with Swedish firms that sell unassembled furniture to Europe by supplying high-quality softwoods is also being examined.

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*1987 is the latest year for which U.S. Census data are available.

Pacific Rim manufacturers are also increasingly interested in the use of softwood lumber from the Province, to the point that they are setting up factories in British Columbia. Two examples are Mitsui Homes and Misaura Homes.

Assuming that shipping costs to Europe for Provincial products are competitive, this value-added opportunity may deserve particular consideration. A key issue is whether the size of this market justifies the cost of marketing and adding converting facilities. Supplying specified size blanks of high-quality softwood to the United States may also be substantial opportunity.

Structural Wood Members

This sector has not historically been a significant segment of the Canadian industry production. In contrast, U.S. manufacturers shipped fabricated structural wood members in 1987 valued at nearly $2 billion. Growth in this industry has been rapid, averaging 10%/y in constant dollars between 1981-1987. Such growth merits further investigation by potential Provincial manufacturers.

Growth in demand for prefabricated wood products used in large scale residential construction in the U.S. and Europe will primarily be determined by the differential between the costs of on-site versus in-plant fabrication of home building components. Generally, prefabricated materials are most economical when the shipping distance from the fabrication facility to the point of use is reasonable. The ability to achieve lower-cost transport for prefabricated products to building sites will be critical in successfully serving this product market.

In the immediate future, the United States will be the target of obvious effort. Roof trusses joined with metal plates constitute the largest U.S. market (47%), followed by glue laminated lumber (15%) and "sawn lumber" fabricated members for construction purposes (5%). The balance of shipments consists of a such fabricated wood products as wooden I-beams, roofing, and wall and floor panels. This profile should be the basis for effort to expand the domestic market for such products and to identify niches by which to incrementally penetrate the proximate U.S. market.

In terms of future markets Japan will be a major target. Demand will increase for structural members and components. The crux will be to increasingly grade to Japanese standards and specifications. This tailoring to market will be required for greater penetration of the European market as well.

One example of a product which may be a future export opportunity is MSR (machine stress rated) lumber. Although calibrations are different in Europe some industry experts believe that lumber could be rated and stamped in British Columbia for use in mass produced timber frame housing, particularly in the United Kingdom.

Reconstituted Wood Products for Structural Applications

This category includes oriented strand board, waferboard, parallel laminated lumber, and end- and edge-glued lumber made from a variety of thin flakes, veneer or solid pieces "reconstituted" using adhesive, heat, and/or pressure. These products allow lower value timber to be upgraded by eliminating defects and making specified lengths in various widths. The added manufacturing step is justified by the lower cost of the fiber – often from plentiful hardwoods –

that can be used, as opposed to the use of a solid wood product. These products often substitute for dimension lumber or softwood plywood products and satisfy the growing need for wide dimension components.

One item of particular interest to British Columbia shippers is laminated veneer lumber (LVL). Demand for the veneers is increasing in the United States and Japan, again as a result of the declining quality of natural wood. This product can be produced in big billets for shipment and then broken down at final destinations. Initial plant and equipment investment costs are high, however, approaching $40-50 million.

U.S. production and demand for reconstituted panel products in construction increased significantly in the 1980s. Unless the wood costs for these products increase rapidly, the market share for reconstituted panels is likely to continue to grow. The reduced U.S. supply of defect-free softwood timber is a primary driver of the growth in reconstituted panel products. Low water transportation costs to the large Southern California market should stimulate British Columbia producers to consider this market.

On the other hand, British Columbia's historic comparative advantage has been its supply of *higher quality* softwood timber. This difference suggests, however, that opportunities for the Province in value-added reconstituted wood panel products must be developed through the use of plentiful, lower quality wood such as aspen and stagnant lodge pole pine. Pacific Rim nations—particularly Taiwan and Korea—are likely markets for such reconstituted wood, particularly in furniture.

Higher Value Products

Some industry analysts have suggested that, in addition to the products discussed above, at least four basic kinds of "higher value products" – treated wood products, paneling, industrial blanks, and white papers – should be considered as a major means for upgrading the output of the Province's forest products industry.

The British Columbia forest products industry has made each of these products for many years, demonstrating its recognition of opportunities to upgrade output and increase profitability per unit of wood consumption. If production has been slow to expand, this suggests that market and competitive constraints have historically been a substantial deterrent to such investments.

Treated Wood

In treated wood products, the U.S. South has greatly increased output from southern pine of lower quality than old-growth softwoods in the Province and improved its market share in the United States at the expense of both British Columbia and the U.S. Pacific Northwest. There does not appear to be readily apparent, underserved markets at the present time. In this context a substantial portion of the Canadian market is and will continue to be served by Provincial manufacturers.

Shakes and shingles have historically been a major export market for British Columbia producers. Treatment of shakes and shingles is now required in European nations and will shortly be required in the major U.S. markets, Texas and California. These requirements pose a challenge for British Columbia producers since treatment can double initial production costs.

Panelling

In panelling, the ample availability of hardwood plywood from Southeast Asia and the Orient, together with the rapid growth in the use of relatively inexpensive reconstituted panels for decorative purposes, cabinetry, and furniture in U.S. markets, may constrain opportunities for expanded output in the Province. Offsetting this possibility is the diminishing, nonreplacable supply of hardwood in Southeast Asia.

Increased movement into the European market will also be a challenge. European manufacturers, particularly the Germans, produce high quality specialized panelling. The Swedish and Finnish manufacturers are also high quality producers. The niche for B.C. producers may be to provide appropriate industrial blanks for top line European producers.

Industrial Blanks

In regard to industrial blanks and the manufacture of products cut precisely to special sizes, particularly for export to Japan, major Provincial companies have tried for years to overcome obstacles to increasing such exports. Progress has been made, but the number of mills cutting lumber and lumber products to Japanese specifications has also increased substantially in the U.S. Pacific Northwest. This condition points to the existence of substantial, proximate competition with regard to this sector.

One sector which can improve the competitive position of the Province's companies is the growing market for industrial blanks in Europe for specialized furniture products. It is our understanding that some B.C. producers are pursuing this opportunity with substantial success.

White Papers

White papers have historically been an area of strong domestic productive capability in British Columbia. However, expansion of output and exports to the United States was very slow even before the recent lowering of tariffs on U.S./Canadian trade in paper and paperboard. That development has tended to open the door to larger Canadian imports of white papers from lower cost, large-volume producers in the United States. Furthermore, greatly expanded production of white papers in the Province is hampered by the distance of suitable quality hardwood fibers from the major U.S. markets for these products.

In the future, demand for high quality paper among Pacific Rim nations will be a market opportunity. We do not believe, however, that it is an immediate major opportunity. There is too much competitive capacity in the United States.

CONCLUSIONS

In conclusion, we believe that the industry and the Province must promote the expansion of the British Columbia forest products industry into appropriate higher value sectors. Increasing market share will take time, however, given the established competitors in these sectors and the locational disadvantages which must be lessened.

Market efforts must be based initially on the Province's supply of quality softwood fiber and its proximity to the large U.S. market. Given the relatively small size of most higher value and value-added markets, success in several product areas is likely to be required to offset potential declines in commodity products that may result as Provincial wood costs rise in response to higher stumpage. Restructuring the Province's production toward more higher value products will require significant initiative, rapid responses to changing market and product life cycles and will present substantial risk. Forming business relationships with foreign partners that wish to secure sustained supplies of quality softwood fiber may prove economically desirable.

As mentioned in the beginning of this chapter, this overview is a compilation of informed first impressions. Indepth market analysis on a product by product basis must take place. New market entry in higher value segments of the wood product industry will not be easy given current general market conditions. Nonetheless, SRI is cautiously optimistic about these market opportunities as a result of several advantages which the higher value sector offers:

- Less susceptibility to cyclical instability and money market fluctuations
- Greater employment per unit of timber
- The requirement for high quality wood in specific finished products
- Use of species in less demand (i.e., alder, aspen).

Creating and expanding opportunities in the Province will require immediate attention because timber producing areas in the U.S. Pacific Northwest are also moving into this market sector, as indicated below:

- Washington – The state's Department of Trade and Economic Development is conducting feasibility studies, providing technical assistance to mills, and promoting market opportunities for home-based value-added operations.
- Oregon – The state has commissioned a strategic marketing plan that identifies several component end-use products for manufacturing, including window frames, wood molding, furniture components, and structural beams and trusses.
- California – The state has initiated research and market development programs to identify and promote value-added products. This effort has led to the creation of a large successful furniture manufacturing industry that uses tan oak (historically an unmerchantable species).

In summary, we believe that development should be initiated in the immediate future, built incrementally, and developed in tandem with production and marketing efforts that have been initiated by established manufacturers and the Provincial government.

APPENDIX B

METHODOLOGICAL FRAMING FOR VALUATION

If we assume that the only source of benefits from the forest resource is the forest products industry, the value of the industry itself would be equal to the value of the forest. We have derived a value of the total forest resource using the following formula:

Value of Forest = Benefits/Discount Rate

If the value of the industry is equal to its market capitalization and its market capitalization can be determined by the formula

Sales - Expenses/Rate of Return,

then we can say that;

Sales - Expense/Rate of Return = Benefits/Discount Rate.

Using an inflation adjusted required rate of return for the forest product industry of 13.5% and the rate for discounting future benefits determined above (6.73%), we can see that the profitability of private industry must be approximately 2 times the level of benefits to attract levels of capital capable of producing the desired benefits without depleting the resource.

Sales - Expenses/.135 = Benefits/.0673

Sales - Expenses = Benefits (2.01)

Arguably, the amount of capital currently supporting the forest product industry is sufficient to produce the level of benefits currently being extracted from the forest resource of British Columbia on a sustained basis. The continuing issue will be to sustain a return on investment commensurate with the present and anticipated level of investment occurring within the context of a very competitive international market.

Over the past two years, total payments to government have actually declined as a percentage of total expenses. However, in spite of the apparent unprofitability of the forest products industry, direct economic rent--stumpage and licensing fees not excessive nor a major cause of the industry's profitability problems. Declining sales and dramatically higher interest expenses are the most significant contributors to the industry's current lack of profitability.

Ultimately, however, the only way to answer questions regarding the optimal pricing of economic rent is to permit markets for competitive, alternative uses of the forest resource to function more freely. Reallocations of resource use will affect the costs and benefit streams. Higher economic rent for access to resources will also affect costs, demand, and the flow of benefits to stakeholders.

As stated previously, the rational reallocation of resource usage will be accomplished through a well constructed land use plan that is openly debated by all constituents. The costs of preserving resources must be recognized as a conscious economic choice that may lead to either reduced services or higher taxes to make up lost revenues. Higher economic rents will no doubt lead to a rationalization, i.e., restructuring, of some industries. However, they will also ensure that resources are used for their highest marginal utility.

APPENDIX C

GLOSSARY

Acronyms

AAC	Allowable annual cut
BCFS	British Columbia Forest Service
BCFRC	British Columbia Forest Resources Commission
FL	Forest licence
LRUP	Local resource use planning
OTT	Old temporary tenures
PSYU	Public sustained yield units
RMA	Resource management agreements
TFL	Tree farm licence
TSA	Timber supply area
TSHL	Timber sale harvesting licence
TSL	Timber sale licence

Definitions

Accessibility	An assessment of the effect that availability of access, topography, and soil have upon the cost of harvesting a given timber stand.
Allowable annual cut	The volume of wood that may be harvested, under management, in a year.
Allowable cut effect	The increase in early harvest from an existing forest that results from changed assumptions about the productivity of the future forest.
Apparent surplus	The difference between the estimated AAC and harvest, if this difference is positive.

Biological diversity or biodiversity	The diversity of plants, animals and other living organisms and their habitats measured by factors such as genetic variability, number of species and variation in species composition.
Clearcutting	Complete removal of all trees from a given area at one time.
Commercial species	A tree species for which there is a current market.
Corridor	A continuous strip of land or water connecting two geographically separate points and used for the conveyance of humans, animals, goods, energy or information. It refers to roads, railways, pipelines and power transmission facilities, to waterways like the Inside Passage and to wildlife migration corridors.
Critical habitat	Habitat that is crucial to the size, distribution or stability of a wildlife or fish population.
Direct forest revenues	Revenues that accrue to the Provincial Government from the stumpage, royalties, lease and license fees paid by holders of timber harvesting tenures.
Economically accessible	Forest management units and forest stands for which the AAC can be profitably harvested within the foreseeable future.
Economically inaccessible	Forest management units and forest stands from which the AAC cannot be profitably harvested (at some specified date).
Ecosystem	A forest ecosystem is a complex system of biophysical processes and living organisms and other interacting components and processes. It comprises plants, animals and microbes, interacting with soil and climate.
Environmentally sensitive area	Areas requiring special management attention to protect and prevent permanent damage to important scenic values, fish and wildlife resources, historical and cultural values, and other natural systems or processes. They are also identified as requiring special management attention to protect life and safety from the risk of natural hazards.
Even-aged management	Even-aged management produces a final harvest in which all or most of the older trees are removed and a relatively even-aged new tree crop is established.

Forest industry sector	In the context of this report consists of the following industries: extractive logging and forestry, wood mills (e.g., lumber, plywood, shakes and shingles), and pulp, paper and allied.
Forest land	Land primarily intended for growing or currently supporting forest. Includes land not now forested, for example, clearcuts, northern lands that are now forested but not intended for use, and plantations.
Forest licensee	The holder of a tree farm licence, forest licence, pulpwood agreement, timber sale licence, or timber licence under the Forest Act.
Forest licence	A forest licence allows an orderly timber harvest over a portion of a sustained-yield management unit and the timely reforestation of harvested areas according to a strategic resource management plan prepared by the BCFS for the TSA. The licence has: a term of 15 to 20 years, replaceable every five years (some are non-replaceable); and, operating areas which continuously shift over time within the TSA - once an area is harvested and reforested, the licensee moves to another part of the TSA.
Forest management unit	An area of forest land managed as a unit for fiber production and other renewable resources. This unit can be the entire province or territory, a provincial forest management subdivision, an industrial timber limit, etc.
Higher value	The additional income generated by processing beyond the raw material stage for particular or specialized segments within the manufacturing stream.
Integrated resource management	The comprehensive management of two or more natural resources over a defined area with regards to maintaining, or enhancing where possible, resource quality in perpetuity, and to avoiding permanent or long-lasting damage to any resource so that the resources are managed in a manner compatible with present and foreseeable future needs.
Integrated resource planning	A flexible and consultative decision-making process which examines the interaction of various resources, resource uses, developments and trends, and provides for interaction with stakeholders in the search for information, shared values, consensus, and actions that are both feasible and acceptable.

Inventory	The stock of a resource occurring in an area of land, measured to a specified standard such as species, age or size.
Land use classification	A process of assigning similar characteristics, capabilities and uses that reflects the individual ecosystems of the provincial land base.
Land use plan	A plan for a portion or all of a TSA or TFL which integrates management guidelines for resource uses in the area. A local Resource Use Plan refines the objectives set out in Forest Land Management Plans.
Local resource use planning	Within the context of management strategies for a TSA or TFL, local resource use planning establishes integrated resource management guidelines for areas where resource use development is proposed. Local planning can range from extensive appraisal to intensive study and is carried out to enable development planning to proceed.
Long run sustained yield	A measure of the productive, long-term carrying capacity of a defined area for specified management assumptions.
Manufacturing shipments	Similar to the value of production, measured at the factory gate.
Mature	In even-aged management, those trees or stands that are sufficiently developed to be harvestable and that are at or near rotation age (includes overmature trees and stands if an overmature class has not been recognized).
Merchantable	Of a tree or stand that has attained sufficient size, quality, and/or volume to make it suitable for harvesting.
Natural resource	A renewable or non-renewable element of the natural environment having a tangible or intangible value which is produced, developed, or utilized for social and/or economic benefits.
Not satisfactorily restocked land	Refers to productive forest land denuded by logging or fire that still lacks a desired number of trees in "free to grow" condition.
Old growth	There is no single definition of old growth, but the term is generally agreed to refer to a relatively old and undisturbed forest. An old growth forest contains live and dead trees of various sizes, species

	composition, and age class structure that are part of a slowly changing but dynamic ecosystem.
Overmature	In even-aged management, those trees or stands past the mature stage.
Provincial forests	A designation under the Forest Act. Land that is deemed to provide the greatest contribution to the social and economic welfare of the Province if predominantly maintained in successive crops of trees or forage, or both, or maintained as wilderness. Currently about 85% of the Province.
Public sustained yield unit	Introduced in the Province after the Sloan Report of 1945 as a form of tenure to be managed by the Forest Service for sustained yield. After 1978, known as TSAs.
Range land	Land used for grazing by domestic livestock and wildlife including grasslands and forest lands with an understorey or periodic cover of herbaceous or shrubby vegetation.
Reforestation	The natural or artificial restocking of previously forested lands.
Regeneration	The renewal of a forest crop by natural or artificial means. Also, the new crop so obtained. The new crop is generally less than 1.3 m high.
Regulated land	Forest lands where the Provincial Government has control over setting or regulating the AAC.
Rotation	The age at which a forest crop is harvested and replaced by a new stand.
Royalty	The payment due to the Crown for timber harvested from private lands granted in British Columbia since 1887 and from old temporary tenures.
Second growth	A stand of timber that has replaced a former or old growth stand and is in an immature or thrifty condition.
Selection logging	The removal of mature trees, usually the oldest or largest, either as single scattered trees or small groups at relatively short intervals. The system promotes a forest of uneven age.
Silviculture	The science and art of growing and tending forest crops.

Stand	A community of trees with sufficient uniformity of species, age and condition as to form a distinctive entity as a silvicultural or management unit.
Stewardship	For forests, stewardship is the constructive use and development of the forests, measured against a long-term standard of trusteeship.
Stumpage	The price paid to the Government by licensees for the cutting of trees on Crown land. Calculated since 1987 by what is known as comparative value pricing; licensees pay stumpage reflecting the value of their timber stand relative to the value of an average stand in their region.
Sustained yield	The yield that a forest can produce continuously at a given intensity of management without impairment of the productivity of the land. The intention is a balance between timber growth and harvesting on a sustainable basis.
Tenure	An agreement that confers on licensees the right to harvest a certain volume of timber on Crown land within a certain timeframe.
Timber sale licence	This licence allows the orderly harvest of relatively small volumes of timber by: operators with small allowable annual cuts; operators registered under the small business forest enterprise program or others with temporary cutting rights; and, holders of pulpwood agreements.
Timber supply area	In TSAs (which are a revision to and a consolidation of the former PSYU) the forest companies manage the timber resource according to strategic resource management plans prepared by the Forest Service. The most common timber tenures in a TSA are the forest licence and the timber sale licence. There are 35 TSAs in British Columbia and 32 TFLs.
Timber supply—economic timber supply	The rate at which timber will be made available for harvesting in response to a range of product prices. Also sometimes refers to the economically accessible portion of the physical stock of timber.
Timber supply—physical timber supply	The rate at which timber can be harvested (usually at a sustained level), without consideration of prices. Also sometimes refers to the physical stock or inventory of wood.

Tree farm licence	The TFL is a 'stewardship' agreement over a sustained-yield management unit. This includes the right to harvest a specified volume of timber annually and the obligation to carry out all phases of forest management on behalf of the BCFS. The licence has: a 25-year term, replaceable every 10 years; and, fixed boundaries.
Unregulated land	Forest lands where the Provincial Government has no control over setting or regulating the AAC. In most instances these are private lands.
Valuation	The value or price set upon a resource at its estimated or determined market value.
Value added	The additional income generated by further processing beyond raw material stage up to final 'end use' product.
Vancouver log market	A clearinghouse for exchanges of logs and chips. Prices from the Vancouver log market are used as part of stumpage calculations.
Watershed	The area drained by a river, stream or other waterway.
Wilderness	An area of land greater than 1,000 hectares that predominantly retains its natural character and on which the impact of man is transitory, minor and in the long run substantially unnoticeable.
Withdrawals	Areas removed from the forest land base.
Woodlot licence	Small, area-based tenure not attached to processing facilities. Originally developed as an adjunct to ranching to provide seasonal employment opportunities.

Note: These definitions are in accord with the manner in which the respective terms have been used and interpreted in the context of this report. They are based upon the Glossary utilized by the April, 1991 Forest Resources Commission Report - "The Future of Our Forests" and other industry publications.